BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

Vol. 46] 1949 [No. 6

SUMMARY OF RECENT ABSTRACTS*

V. LEISHMANIASIS

VISCERAL LEISHMANIASIS

Epidemiology : Aetiology : Transmission

GIRAUD *et al.* (p. 984) review the incidence of kala azar in the Marseilles area, where 238 cases have been seen since 1923. It is found chiefly in children under 3 or 4 years of age, and the disease is also common in dogs. The authors suggest that transmission may be from dog to child by ticks rather than by sandflies, but this view is supported only by indirect evidence. RANQUE *et al.* (p. 883) also make the point that canine leishmaniasis is still found around Marseilles, and stress that early diagnosis can be made by gland puncture, before the formol reaction or the clinical features are diagnostic. Leishmaniae were found by DE AZEVEDO *et al.* (p. 985) in 6·5 per cent. of 137 dogs examined in Lisbon. LUENGO ARROYO *et al.* (p. 163) report that infantile kala azar occurred in 13 provinces of Spain in 1946 ; they think that the squirrel may be a reservoir host, as well as the dog. BALLABRIGA (p. 316) mentions 40 cases of infantile kala azar treated in Barcelona in three years.

BOSSELUT (p. 775) describes disseminated leishmaniasis in a cat in Algiers ; it has rarely been recorded before. The species of leishmania found is not named.

Kala azar is recorded from Sardinia (DORE, p. 418), Palermo (MONDINI, p. 418) and the Tuscan Archipelago (GUIDERI, p. 418). BURGIO (p. 507) reports an increase in the number of cases of infantile kala azar seen in Palermo in 1944–45.

SEN GUPTA (p. 881) traces the history of kala azar in Calcutta since the special clinic was instituted in 1921. One part of the city is a highly endemic area. The number of cases seen rose above the general level in 1923–25 and again from 1944 to 1947, and the author thinks that the latter exacerbation was the result of the famine of 1943, and the presence of susceptible children born since the earlier epidemic wave. He thinks that the virulence of the parasite has been increased by passage through this enfeebled population. HEILIG and SACHDEV (p. 246) suspect that kala azar may occur in Jaipur, India, which is outside the usually recognized endemic area. They admit that the diagnoses on which this suspicion is based are not conclusive.

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1948, v. 45. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

FULTON and JOYNER (p. 775) show that the cotton rat is susceptible to infection with *L. donovani*. The disease progresses but is not fatal. BOLLIGER and BACKHOUSE (p. 883) have transmitted *L. donovani* to the pouch young of 24 Australian possums (*Trichosurus vulpecula*) and one ring-tailed possum (*Pseudocheirus laniginosus*), and describe the lesions produced. It is evident that the first of these marsupials is highly susceptible and may be a suitable animal for investigation of the disease.

HAWKING (p. 506) has succeeded in growing *L. donovani* in tissue culture. SHIH LU CHANG (p. 774) has studied the biochemical activities in culture, and respiration, of three species of leishmania and *T. cruzi*. For details the original abstract may be consulted.

By agglutination, complement-fixation and precipitin tests, SHI LU CHANG and NEGHERBON (p. 590) have shown that culture forms of *L. donovani*, *L. brasiliensis*, *L. tropica* and *Trypanosoma cruzi* possess both species-specific and common antigens. GHOSH and GHOSH (p. 692) have investigated the complement-fixation and agglutination reactions of rabbits immunized with a living culture of *L. donovani*. Titres were high; there is, apparently, no distinction between H and O antigens.

ROMAN (p. 55) gives a list of *Phlebotomus* species caught in Tunisia. KIRK and LEWIS (p. 163) note that *Phlebotomus langeroni* var. *orientalis* is the only one of the *P. major* group whose distribution is related to that of kala azar in the Sudan. Its occurrence is erratic and variable, and this may have some bearing on the erratic and variable occurrence of kala azar. The authors discuss other species found, including *P. papatasi*, and they note that cracks in the soil, and animal burrows, form a vast mass of subterranean resting places. It is not known whether these are also breeding places.

Tests: Clinical Findings

HO *et al.* (p. 694) have compared spleen puncture, sternum puncture and liver puncture as diagnostic procedures in kala azar. Spleen puncture apparently gave the best results, closely followed by sternum puncture, and the authors advise that both should be done to ensure accurate diagnosis. Liver puncture is considerably less useful. The pathological appearances, in one fatal case of kala azar in which death followed spleen puncture, are described by LUBITZ (p. 692).

CARNEVALE (p. 507) describes a test in which the speed of penetration of HCl into serum gel (with Congo red) is measured; the speed is slightly increased in kala azar. TRINCÃO (p. 695) has observed that when HCl is added to the serum of patients with kala azar, jellification takes place.

LEVY and YIENGST (p. 319) describe a case with an incubation period of 17 months.

MOST and LAVIETES (p. 317) describe the signs and symptoms of kala azar as they saw it in 30 American soldiers who contracted the disease in India or in the Mediterranean area. For details the original abstract may be consulted, but they are not exceptional. In comment, NAPIER remarks that his impression of this paper is that it demonstrates how very standardized kala azar is in the adult, whether acquired in India or the Mediterranean.

GATTO (p. 418) describes the splenogram in infantile kala azar, and MURANO (p. 418) a case in which kala azar seemed to be involved in the aetiology of the Banti syndrome.

CARTWRIGHT *et al.* (p. 693) discuss their work on the pancytopenia of kala azar, as they studied it in China. Anaemia is constant, and is of normocytic orthochromic type. Leucopenia is an almost constant feature, and platelets are reduced. The bone marrow is always hyperplastic, and a full description of the cells is given. During effective treatment the parasitized reticulo-

endothelial cells tend to disappear, and the normal elements to increase. RACHMILEWITZ *et al.* (p. 984) think that the cause of the anaemia of kala azar is increased destruction of red cells.

The electrocardiogram shows no valid evidence of change characteristic of kala azar in children ; GIVA and BINAGHI (p. 1074) think that such changes as occur indicate myocardial affection due to a toxic factor or to the anaemia.

SEN GUPTA *et al.* (p. 882) report 4 cases of pneumococcal meningitis in patients with kala azar.

Treatment

ADAMS and SEATON (p. 246) have treated 6 patients with kala azar by an intensive course of intravenous sodium antimonyl tartrate, lasting for only two days. The results were not so good as those obtained with stibosan, urea stibamine or the diamidines, but the course may have advantages if a longer period of treatment is not possible. In a communication relating to this paper, NAPIER (p. 247) refers to the danger in treatment with sodium antimonyl tartrate, and suggests that for intensive treatment the benign pentavalent compounds should be chosen rather than this relatively toxic trivalent salt.

AVERSA and CROSCA (p. 507) did not find that iron added to the value of antimony in the treatment of infantile kala azar, in relation to the blood picture.

CARNEVALE (p. 419) found that there was a concomitant syphilitic infection in four cases of infantile kala azar, which resisted treatment with tartar emetic until the syphilis had been treated. Resistance to antimonials should raise the suspicion of syphilis.

SMITH *et al.* (p. 985) have investigated in animals the tissue distribution of radioactive antimony inhaled as stibine.

BURCHENAL *et al.* (p. 319) record a case of kala azar in which treatment with many antimonial and other drugs was ineffectual, and the patient was eventually cured by splenectomy. After this operation there was rapid improvement in the blood picture and in symptoms ; the spleen was very large and contained a large infarct. The authors discuss the subject and the points which should be borne in mind when splenectomy is contemplated.

ADLER *et al.* (p. 774) think that the Sudan strain of *L. donovani* behaves like *L. infantum* in response to treatment, and should probably be classed as *L. infantum*. They found that propamidine and pentamidine have significantly less action *in vitro* on the flagellates of *L. infantum* than on those of *L. donovani*, but that the effect of stilbamidine is the same on both, though less than that of the other two compounds. In comment, however, LOURIE points out that when measured by a different technique the effect of stilbamidine is much the same as that of the other two drugs against flagellates of *L. donovani*, and suggests that this technique should be used to compare the response to stilbamidine of flagellates of *L. donovani* and *L. infantum*. The L.D. bodies were more sensitive than flagellates to each compound.

COLLARD and HARGREAVES (p. 320) report that in 22 of 24 patients in whom they used stilbamidine for the treatment of Mediterranean kala azar, there occurred late evidence of neuropathy, which was serious. The symptoms were anaesthesia, paraesthesia or hyperaesthesia, usually of the face, scalp and neck, and the skin sometimes became dry and atrophic. No treatment had any effect, but the condition remained at its maximum up to 18 months and then gradually improved. In an investigation of the toxic properties of solutions of stilbamidine exposed to sunlight, FULTON (p. 508) has investigated the constitution of photostilbamidine, the irradiation product of stilbamidine, which apparently undergoes dimerization on exposure to sunlight. HENRY (p. 775) thinks that the delayed toxic effects observed after administration of

stilbamidine may be due to the formation of a monoamide in the body. He discusses the changes which may take place when stilbamidine is exposed to light.

The histological changes in chronic poisoning of animals with stilbamidine are recorded by SEAGER and CASTELNUOVO (p. 164). There were degenerative changes, chiefly in the liver and kidneys.

HAMPTON (p. 56) shows that stilbamidine is excreted largely in the form of a non-fluorescent compound, since fluorimetric methods detect in the urine only one twentieth of the amount detected by colorimetric methods.

CUTANEOUS AND MUCO-CUTANEOUS LEISHMANIASIS

KATZENELLENBOGEN (p. 55) reports a new endemic form of oriental sore (of the dry type) in southern Palestine.

ANSARI (p. 164) has succeeded in infecting white mice by injection of culture forms of *L. tropica*. Intradermal, intraperitoneal and intratesticular injections were successful, but the last were most constantly so, though there were refractory mice in each group. A local granuloma is formed, which eventually gives rise to systemic infection with lesions resembling those of kala azar.

SNOW *et al.* (p. 695) note that cutaneous leishmaniasis is uncommon in the Panama Canal Zone, and they report on 12 cases seen in the Gorgas Hospital since 1937. The lesions were all on exposed parts of the body, and presented as ulcers with multiple small subcutaneous nodules along the regional lymphatics. Leishmania were found in biopsy material from the ulcers. Treatment with various antimonials was successful.

GOLDMAN (p. 247) discusses the classification of American cutaneous leishmaniasis, of which the special feature is involvement of mucous membranes either by direct extension from a cutaneous lesion, or by metastasis. Clinical and parasitological diagnoses are always difficult ; casual scraping of the lesion is useless.

MANGABEIRA-ALBERNAZ (p. 321) describes in detail various forms of leishmanial nasal polyp, as it occurs in American muco-cutaneous leishmaniasis.

GUIMARÃES (p. 508) records (for the first time) that local infection (on the nose) of a hamster with *L. brasiliensis* led to a generalized spread of the infection.

PESSÔA and ROTBERG (p. 696) report favourably on an intensive short course of tartar emetic in the treatment of American cutaneous leishmaniasis.

HERTIG and FAIRCHILD (p. 884) used DDT as a residual spray in the control of sandflies in Peru, with success. They sprayed houses, cavities in dry stone walls, etc., and rarely found sandflies in the sprayed places until several months later. The method seems to be successful in preventing the spread of leishmaniasis and bartonellosis.

MUNIZ and MEDINA (p. 776) describe a new species of *Leishmania*, pathogenic for the guineapig, and TORRES *et al.* (p. 776) give an account of the lesions it provokes.

Charles Wilcocks

MALARIA

BOSCARDI, F. & CORSI, C. Considerazioni epidemiologiche sui malarici di una collettivita' di profughi in Roma, provenienti dalle provincie diverse del Lazio, negli anni 1945–1946. [**Epidemiological Data concerning Malaria among a Group of Refugees in Rome coming from Various Provinces of Latium in 1945–1946.**] *Ann. d'Igiene.* 1948, Jan.–Feb., v. 58, No. 1, 13–22, 4 figs. & 1 map.

In 1945 many thousands of refugees arrived in Rome fleeing from battle areas. Of 7,225 that were under observation 3,551 came from one or other of the five provinces of Latium. Of the latter, 408 were suffering from malaria, some of the sufferers coming from districts which had been free from endemic malaria till the destruction of war had caused a remarkable extension of infected territory. Of 1,266 refugees from Latina 28·5 per cent. were infected; of 406 from Frosinone 7·14 per cent., and of 1,848 from the Province of Rome 0·97 per cent. There was no malaria among the small number of refugees coming from the Provinces of Rieti and Viterbo. The intensely malarious area was confined to the whole of the Province of Latina, a small adjacent part of the Province of Rome and the southern third of the Province of Frosinone.

Norman White

DELBOVE, P. & CAPPONI, M. Impaludation et prémunition en milieu cambodgien. [**Malaria Infestation and Premunition of Cambodians.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 7/8, 474–8.

Malaria has afflicted Cambodia since ancient times. To it has been ascribed the disappearance of the Mon-Khmer civilization. Today malaria is severely endemic or hyperendemic throughout the country, with the exception of areas bordering on the Mekong River and the Great Lakes. Nevertheless the adult Cambodian is generally a robust person, capable of really hard manual labour, and appears to suffer little or nothing from his malaria infection. But the observations recorded in this paper indicate that the Cambodian's noteworthy tolerance of malaria is not due to a state of premunition properly so called. Spleen rates and parasite rates of adults are not very much lower than those of children and they are subject to well-marked seasonal variation. In the rainy season, these rates approximate those that one would expect among a population devoid of premunition in a highly malarious region. In the long dry season there is a marked reduction in the parasite rate, most marked among adults, but the spleen rates persist at a high level. It would seem that exposure to infection throughout the year is necessary to the development of premunition such as is acquired by the Moïs in the high plateaux of Southern Indochina.

Norman White

NETO, J. C. de M. F., TÔRRES, A. L. & PINTO, G. F. Estudo epidemiológico sobre a malária na localidade no Imbuí (Municipio de Niterói, Estado do Rio de Janeiro) e plano para o saneamento da região. [**Epidemiological Study of Malaria in Imbui (Niteroi District, State of Rio de Janeiro) with a Plan for the Sanitation of the Area.**] *Rev. Hig. e Saúde Pública.* 1947, Oct.–Dec., v. 5, No. 3, 1–38, 6 graphs & 23 figs.

Imbui lies 12 kilometres south of the city of Rio de Janeiro. The area surveyed contains a civil population of 693 living in primitive conditions, mostly fisher folk. Malaria and malnutrition are rife; tuberculosis is very prevalent. There is also a Fort with a garrison strength of some 125 to 155, which is changed annually. In 1945 there were 50 cases of malaria in the

garrison, and 68 cases in 1946. *P. vivax* infections were most common: *P. malariae* was rare. The most prevalent anopheline was *A. tarsimaculatus*, the chief vector: a lagoon was the chief breeding place. *A. bellator* also occurs: bromeliads are plentiful in the district. Control measures include the construction of a dyke from the sea to a large lagoon: the resulting increase of salinity of the lagoon water should prohibit mosquito breeding.

Norman White

GORDON, R. M. & CREWE, W. **The Mechanisms by which Mosquitoes and Tsetse-Flies obtain their Blood-Meal, the Histology of the Lesions produced, and the Subsequent Reactions of the Mammalian Host; together with some Observations on the Feeding of** *Chrysops* **and** *Cimex*. *Ann. Trop. Med. & Parasit.* 1948, Dec., v. 42, Nos. 3/4, 334–56, 2 graphs, 9 text figs. & 14 figs. on 4 pls. [44 refs.]

This study is not primarily concerned with clinical aspects of insect bites; it deals chiefly from a parasitological viewpoint with the local trauma and reactions at the site of the bite since it is the authors' opinion that these may be found to play an important, possibly essential, part in the transmission and subsequent development of certain insect-borne infections.

The paper is divided into Part I, concerned with the bites of mosquitoes (*Aëdes aegypti*, *Anopheles maculipennis* and *Culex molestus*) and Part II, dealing with tsetse fly bites (*Glossina palpalis* or *G. morsitans*). Some notes are included on the bites of *Chrysops* and *Cimex*.

Part I.—The methods by which *Aëdes aegypti* obtains blood from its host were described by GORDON and LUMSDEN [this *Bulletin*, 1940, v. 37, 653] who showed that the fascicle is capable of distal flexure after deep insertion; it is capable of either penetrating a capillary, curving along its course, and drawing blood directly from it or, alternatively, one or more capillaries are lacerated with a resultant haemorrhage into the inter-capillary tissues from which the mosquito then feeds ("pool-feeding"). Salivary secretion is injected into the tissues at intervals during the process of biting.

In non-sensitized animals, and presumably in non-sensitized human beings, the only immediate effect of the bites of *Aëdes aegypti* is the occurrence of slight haemorrhages. These persist for at least twenty-four hours. Agglutination of red blood corpuscles occurred only in bites of *A. maculipennis*, which is known to contain an agglutinin in its salivary secretion [this *Bulletin*, 1924, v. 21, 783].

It is recognized (HECHT, *Rev. Sanid. Assist. Soc.*, Caracas, 1943, v. 8, 391; and MELLANBY, this *Bulletin*, 1947, v. 44, 240) that reactions to mosquito bites may consist of an *immediate weal reaction* and a *delayed papular reaction*. The immediate reaction is often severe and attracts attention; the delayed reaction is generally less apparent and is frequently overlooked.

The *immediate weal reaction* fails to appear in persons not previously bitten by a particular species of mosquito but, after repeated irregular exposure to its bite, a state of allergy is developed and the weal reaction appears during or immediately after a bite. This allergic response persists unless the host is exposed to regular and frequent bites, in which case the reaction diminishes progressively in duration and intensity until the host is desensitized and ceases to react. Sensitization can be avoided if a person not previously bitten by a particular species of mosquito is exposed regularly and frequently to its bite. For example, no reaction occurred in a person exposed almost daily for 185 days to two or three *Aëdes aegypti* bites. The causative substance is shown to exist in the salivary secretion of the mosquito. Sensitivity is highly specific; a person about equally sensitive to two species of mosquito was desensitized

to one (*Aëdes aegypti*) and retained sensitivity to the other (*Culex molestus*). In the event of a person ceasing to be exposed regularly to bites the state of desensitization may be lost and the reaction reappear.

The *delayed papular reaction* appears within about twenty-four hours after the first exposure, or first few exposures, of a person unsensitized to the bite of *Aëdes aegypti*. It may then persist for about 160 hours. Over a period of time its onset comes earlier and its duration and intensity are diminished. Loss of this reaction follows both regular and irregular exposure to bites. Its causation is attributed by the authors to a slow-acting toxin injected with the mosquito's salivary secretion and not to sensitization as in the case of the immediate reaction. The localised swelling of the delayed reaction is histologically shown to be due to the separation of collagen fibres by extravasated fluid from the lacerated capillaries ; small haemorrhages are attributed to the action of the mouthparts at the time of biting.

It is suggested that the " immunity " of indigenous persons in the tropics to mosquito bites is not a racial characteristic but is due to their exposure to constant bites from birth.

Part II.—The proboscis of the tsetse fly is capable, like that of the mosquito, of distal flexure. Feeding from intercapillary haemorrhages (" pool-feeding ") is considered to be the usual source of blood of the feeding fly. Such a haemorrhage increases during the first twenty-four hours, except in the case of bites by flies from which the salivary glands have been removed, and part of the blood may sink among the underlying muscle fibres ; the blood is invaded —mostly by histiocytes—after forty-eight hours and, after seventy-two hours, the tissue is again normal. This uncomplicated resolution of the haemorrhage occurs in non-sensitized persons in whom, furthermore, no visible reaction can be detected on the occasion of their first, or first few, bites from tsetse fly. On the other hand in sensitized persons—and this state can be attained after as few as four or five bites—there is, presumably owing to leakage of fluid from damaged capillaries, extensive separation of collagen fibres and dilatation of vessels to form a weal. Severe swelling of adjacent parts occurs in highly sensitive persons. Removal of the fly's glands prevents the appearance of the weal in sensitive persons and it is, therefore, concluded that the substance responsible for the reaction is in the salivary secretion. It is probable, from general evidence, that desensitization follows continuous regular exposure to bites and that although sensitization is not localized, desensitization is most marked in the bitten area. This seems to apply both to tsetse and mosquito bites. The authors find no evidence in tsetse fly bites of a delayed action nor of the slow toxic poison which they consider to be responsible for it in mosquito bites.

Chrysops and *Cimex* bites also give rise to a subcutaneous haemorrhage and, in *Cimex*, distal flexure of the mouthparts in the skin is demonstrated. It seems then that " pool feeding " is a frequent event in blood-sucking insects ; it is probably the rule in tsetse fly feeding, but capillary feeding is thought to be more usual in mosquitoes.

This paper is, in addition to its original matter, a comprehensive collation and discussion of a widely scattered literature on the subject of insect bites, the interpretation of the host-reactions, the use of antigen for desensitization, and the effects of drugs on bites. In this last connexion the anti-histamine drug benadryl, at 150 mgm. daily for three days, gave no appreciable change in the appearance of the immediate reaction in two persons highly sensitive to *Aëdes aegypti* but the itching sensation was markedly diminished. There was, however, some indication that a general reaction which follows injection of large amounts of salivary antigen into a highly sensitive person is reduced by the drug.

The plates consist of one photograph of the proboscis of a tsetse fly penetrating skin (skin section at × 200) and 13 photographs of skin sectioned at different intervals after insect bites. *D. S. Bertram*

SEPULCRI, P. & MIRSA, A. Ciclo gonotrofico delle anofeline ibernanti in provincia di Venezia. [**Gonotrophic Cycle of Anophelines hibernating in the Province of Venice.**] *Riv. di Malariologia.* 1948, Aug., v. 27, No. 4, 139–50, 1 map.

The English summary appended to the paper is as follows :—

"The authors have observed that hibernation of *A. maculipennis* starts, in the province of Venice, at the end of October and continues during November ; it is nearly complete by December and lasts the whole month of January. At the beginning of hibernation (November) the dissociation and gonotrophic disharmony may possibly explain primary malaria infections ; the danger does not exist in December and January.

"During the month of February *Anopheles* become active again and start their gonotrophic activity, which in March is extended to 95% of the captured adults."

FARID, M. A. **A Preliminary Note on an Unusual Breeding Place of *Anopheles gambiae* in Egypt.** *J. Roy. Egyptian Med. Ass.* 1943, Apr., v. 26, No. 4, 123–8, 2 figs.

After noting the measures taken to eradicate *Anopheles gambiae* from Egypt, the author records the finding of the larvae of this mosquito among the floating mats of the water plant *Potamogeton*, in the river Nile. One such mat was 3–10 metres from the shore, 5–7 metres wide and 500 metres long. Another mat was in water so deep that it could be reached only by boat. The necessity for the destruction of these *Potamogeton* mats is stressed, because pieces break off and float down the river, taking the larvae with them. *H. S. Leeson*

MAURITIUS, COLONY OF : **Annual Report on the Medical and Health Department 1947** [RANKINE, A., Director]. 46 pp. 1949. Port Louis : J. Eliel Felix, Govt. Printer. [60 cents.]

In this Report [which will be reviewed separately] it is noted that during the course of a mosquito survey of the Savane District of Mauritius in 1947, a specimen of *Anopheles melas* was found in November in the village of St. Martin. This is the first record of the finding of this species in Mauritius. It is added that a few days later, in the same village, another mosquito new to the island was discovered : this was a species of *Mansonioides*.

H. J. O'D. Burke-Gaffney

LEESON, H. S. **Anopheline Larvae collected in Arabia.** *Ann. Trop. Med. & Parasit.* 1948, Dec., v. 42, Nos. 3/4, 253–5, 1 map.

A report on anopheline larvae collected in 1944 and, in a footnote, on anopheline adults taken between January 1947 and February 1948 in Arabia. The larval collections were made in the coastal area from Jubail to Khobar, and at Hoffuf and in the area of El Kharj about 50 and 200 miles inland, respectively ; and from parts of the Oman and Trucil Oman area at the entrance to the Persian Gulf. Adult records are restricted to the Jubail–Khobar area and to El Kharj.

In January in the Jubail–Khobar strip, larvae of *A. stephensi*, the most numerous species, were encountered particularly in drains, wells and borrow

pits. *A. fluviatilis* larvae occurred in shaded fresh-running water in drainage and irrigation canals and, at Saihat, in brackish wells. Other larvae recorded, in order of frequency, were *A. sergenti*, *pulcherrimus*, *multicolor* and *coustani*.

All these species were also found at Hoffuf in the larval stage with the addition of a few *A. hyrcanus* larvae and one specimen, accepted as *A. cinereus*, but in which it is noted that hair 13 of the ventral prothorax has three branches instead of six or seven as described for this species elsewhere. *A. stephensi* and *A. fluviatilis* larvae were common. No adults from this area are recorded in the 1947–48 collection.

In the El Kharj area, only *A. multicolor* larvae were observed in February despite a careful search for other species; it occurred in drains, irrigation canals, and wells. The adult records consist of *A. multicolor* and *A. stephensi*.

In most of the parts of Oman and Trucil Oman examined in March and April 1944, *A. culicifacies* was the only species found and bred chiefly in freshwater wells. A few larvae of *A. adenensis* and *A. stephensi*, however, were taken in this area. No adults are recorded from this region.

The paper concludes with a key to the fourth stage larvae of the species named above with the addition of *A. turkhudi*, *hispaniola*, *d'thali* and *superpictus* which might be expected to occur in this little known region.

D. S. Bertram

DE ZULUETA, J. & BATES, M. **Laboratory Experiments with Selection of Oviposition Site by** *Anopheles darlingi*. *Amer. J. Hyg.* 1948, Nov., v. 48, No. 3, 350–60, 4 figs. [11 refs.]

A study was made of the behaviour of the ovipositing female *Anopheles darlingi* obtained from a laboratory colony. The experimental methods are described in detail and are illustrated by photographs.

Some of the results reported here may mean that visual orientation is of importance in determining the selection of an oviposition site. There were two peaks of egg-laying activity, one after sundown and one after sunrise. Females usually laid their eggs while hovering a few centimetres above the water surface, though some did so while resting on the water or on the sides of the vessel. Upright obstacles, represented by inverted test tubes or glass rods, standing in the oviposition pans, and other objects which broke the water surface, repelled the mosquitoes, but when tubes or rods were stood around outside the pan they were attractive to them. A pan shaded by cardboard 35 centimetres above the water surface was attractive, but a sheet of glass in the same position had no effect; if the glass was lowered to 15 centimetres the pan was avoided.

These and other results indicate a need for further experiments on these lines with other anopheline species.

H. S. Leeson

PURI, I. M. **The Distribution of Anopheline Mosquitoes in India, Pakistan, Ceylon and Burma: Part V: Additional Records, 1936–47.** *Indian J. Malariology.* 1948, Mar.–June v. 2, Nos. 1/2, 67–107. [48 refs.]

DY, F. J. & DEL ROSARIO, F. **The Occurrence of** *Anopheles minimus flavirostris* **(Ludlow) in the City of Manila.** Reprinted from *Acta Med. Philippina.* 1948, Jan.–Mar., v. 4, No. 3, 9 pp., 4 figs. & 1 map on 3 pls.

This is the first record of *Anopheles minimus flavirostris** breeding in the city of Manila. It bred in two streams about a hundred yards from a populous area. The possibility that it may transmit malaria within the city is raised,

and the case of a 2-year-old child who may have contracted her infection of *P. falciparum* within the city limits is recorded. It is postulated that heavy losses in "animals" [presumably, caraboa] during the recent war may have caused a spread of the mosquito in the absence of sufficient animal host barriers; or, possibly, this mosquito was missed in previous surveys.

Other species collected in the city area in the present survey were :—*A. manalangi**, *hyrcanus nigerrimus*, *hyrcanus lesteri*, *filipinae*, *tessellatus**, *litoralis** and *subpictus indefinitus**. The collections were made during four days in December and consist mainly of larvae, some of which were bred out; a few adults of the species marked * were taken near the streams

D. S. Bertram

DY, F. J. & GAPUZ, R. B. **Sporozoites of** *Plasmodium* **sp. in** *Anopheles mangyanus* **and Oöcysts in** *A. kochi*. Reprinted from *Acta Med. Philippina*. 1948, Jan.–Mar., v. 4, No. 3, 5 pp., 3 figs. on 2 pls.

Following a report that *Anopheles minimus flavirostris*, the generally accepted malaria vector in the Philippines, was relatively rare in the highly malarious Tabla Valley, a search was made for anopheline adults in the vegetation of stream banks. The following species were taken :—*A. minimus flavirostris*, *mangyanus*, *kochi*, *tessellatus*, *subpictus indefinitus*, *vagus limosus*, *manalangi*, *hyrcanus nigerrimus* and *barbirostris*. Sporozoites were found in the glands of 1 specimen of *A. m. flavirostris* and 2 of *mangyanus*; oöcysts in 3 of the former, in 1 of the latter species, and in 1 female of *A. kochi*. The numbers of each of these species dissected was small, *viz.* 54, 52 and 15, respectively. From 1 to 8 dissections of the other species were negative.

It is not certain that the *Plasmodium* was of human origin but, since the species were collected from the same place and included infected *A. minimus flavirostris*, the results are presented as presumptive evidence that *A. mangyanus* is a vector of human malaria in the Philippines.

D. S. Bertram

WALKER, A. J. **The Teaching of Malaria Diagnosis.** *Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 777–85, 2 figs. [29 refs.]

The author shows considerable disagreement with most previous teachers of malaria as set forth in their published work. Much of the paper is, indeed, a criticism of present teaching of the diagnosis of malaria, and with much of it many practising malariologists will not agree. After discussing the well-known difficulties for the inexperienced in preparing adequate thin blood preparations, the author gives strong arguments in favour of the well-made thick film: many workers will perhaps wonder why these arguments have been considered necessary.

Among his conclusions, the author proposes that well-prepared thin blood smears showing representative stages of the parasite should be used solely to demonstrate the general erythrocytic cycle: that species diagnosis is best taught by demonstrating the special behaviour of *P. falciparum* in the peripheral blood and thereafter by the manner of differentiation between *vivax* and *malariae* infections; and that material for study should consist of actual thick blood films, on the grounds that preparations of them "do not lend themselves to photography or pictures".

The author makes a number of startling statements, the grounds for which are difficult to discover. For example, on p. 778, he suggests explanations for "some reason why the writers of otherwise excellent textbooks have not devoted themselves to a consideration of thick film findings; or the subject did not lend itself to such treatment". Again, on p. 781, with reference to

Schüffner's dots, is the disconcerting observation " I have yet to find a student, intern or technician who can demonstrate it in their own preparations ".

There are many other points with which an abstracter might disagree: not the least of these is the statement at the close of the paper " I request the suppression of too familiar charts and colored plates as being largely responsible for the general inadequacy of the statistics on malaria in this country as well as the hopelessness of the situation of students in regions where malaria exists ". *H. J. O'D. Burke-Gaffney*

KISSIN, M. & ADLEMAN, R. J. **Transient Urticaria in Malaria.** *Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 797–802. [28 refs.]

Five cases of transient urticaria were seen by the authors among 75 cases of malaria which they observed in a general hospital in China. Of the 75 cases, 73 were infected with *P. vivax*, 1 with *P. falciparum*, and 1 was a mixed infection. There was considerable variation in the size of the weals, and the degree of itching present. The rash appeared with the rise in temperature, persisted during the peak, and subsided with defervescence. Only one of the patients gave any history of previous allergic disorder; he had had a single attack of urticaria 12 years previously.

In the authors' experience the first or subsequent rigor might come on without an eruption, but once urticaria appeared as a sign during a bout of malaria, the eruption usually recurred with each temperature rise. The urticaria developed before antimalarial therapy was begun, and could not therefore be ascribed to medication with quinine, quinacrine [mepacrine] or salicylates.

H. T. H. Wilson

CERABONA, M. Contributo allo studio del rapporto tra nefrite e malaria. [**Observations on the Relations between Nephritis and Malaria.**] *Riv. di Malariologia.* 1948, Aug., v. 27, No. 4, 151–8. [20 refs.]

The English summary appended to the paper is as follows :—

" The author summarizes the various theories on nephritis from malaria and gives his observations made on 1,457 patients. Among these he found 13 patients with heavy and 38 a slight renal dysfunction. He considers that it must be admitted that malaria acts as a direct cause on the pathogenesis of renal alteration, even if one has to bear in mind that a prior renal weakness may exist in these individuals."

RADVAN, I. Paludisme et leucémie myéloïde. [**Malaria and Myeloid Leukaemia.**] *Riv. di Malariologia.* 1948, Oct., v. 27, No. 5, 185–90, 2 figs.

The English summary appended to the paper is as follows :—

" A malaria patient (T. M.) with considerable hepatic splenomegaly and a haematological report of the myeloid leukaemia type was cured in two months by a treatment of quinine, pamaquin and efedrin intravenous.

" The author discusses the relation between malaria and myeloid leukaemia and he points out the importance of malaria in the affections of the endothelial reticulum and of the bone-marrow."

FERRARI, A. A dosagem dos sáis de quinina na urina. Seu valôr na clínica. Novos e velhos rumos na profilaxia. [**Estimation of the Salts of Quinine in the Urine. New and Old Methods of Prophylaxis.**] *Brasil-Medico.* 1948, Nov. 20 & 27, v. 62, Nos. 47/48, 404–6.

"A dose of quinine acts more effectively the greater its dilution" because it then more readily penetrates to the capillaries and the reticulo-endothelial system in the organs where the parasites are hidden.

Determination of quinine in the urine is made by the Giemsa iodide-sublimate method. By this, freshly prepared solution of bichloride of mercury (1·8 per cent. in distilled water) is added just before use to an equal quantity of 20 per cent. potassium iodide. The urine is boiled and filtered and the reagent added. A blue disk forms at the junction if quinine is present and the rapidity of its appearance indicates the content of quinine : If within a minute 1/25,000 ; in two minutes 1/30,000 ; in three minutes 1/40,000 ; in five minutes 1/50,000. In a healthy person 0·5 gm. quinine *per os* will be evidenced in the urine in 15 minutes and elimination goes on for 24 hours. Slow elimination, lasting more than 24 hours, is a bad sign, indicating circulatory stasis.

Some persons exhibit an intolerance to quinine and complain of tinnitus and vertigo, but a dose of 0·5 gm. with 5 cgm. of extract of *Cinicifuga racemosa* taken in a capsule at 5 a.m., followed an hour later by a cup of coffee and a stay in bed for two hours, proved quite satisfactory in the author's experience. A single dose each morning [for how long ?] resulted in disappearance of the parasite. The author concludes that at this hour of the morning sporogony is taking place and the drug acts directly on the parasites in the blood. During the night the rosettes divide up and the schizonts dispersed in the plasma are attacked immediately by the quinine.

In subtertian infection the intravenous route is to be preferred ; the contents of an ampoule diluted in 100 cc. physiological saline "gave admirable results in hospital practice". The collaboration of the reticulo-endothelial system in destruction of the parasites, he maintains, is facilitated by proper dilution and penetration of the quinine into the capillary network.

H. Harold Scott

LEBON, J., CHOUSSAT, H. & CHOUSSAT-CLAUSSE, J., Mme. Tétanos sidérant après injection de quinine. [**Fatal Tetanus after a Quinine Injection.**] *Bull. Acad. Nat. Méd.* 1949, v. 133, Nos. 1/2, 42–5.

Account of a fatal case in a child.

VANE, J. R. **Some Pharmacological Actions of Paludrine.** *Brit. J. Pharmacol. & Chemotherapy.* 1949, Mar., v. 4, No. 1, 14–21, 6 figs. [31 refs.]

A study of several properties.

MULLICK, K. L. B & GUPTA, J. C. **Further Observations on Parenteral Paludrine Hydrochloride in Malarial Fevers.** *Indian Med. Gaz.* 1948, Oct., v. 83, No. 10, 458–9.

This is a report of the treatment of 191 patients suffering from malaria with intravenous injections of paludrine. The patients were employees of the Ludlow Jute Mills, Chengail. The diagnoses were based on clinical symptoms. In this locality 95 per cent. of malaria infections are said to be due to *P. vivax.* Paludrine tablets were dissolved in normal saline solution, one tablet, 0·1 gm., in 5 ml. After sedimentation the clear supernatant fluid was siphoned off and autoclaved. Twenty ml. (4 tablets) were usually injected ; some patients received 30 or 35 ml. at an injection. Fever was suppressed in 75 per cent. of

the cases within the 12 hours following the injection. The dose of 20 ml. was as effective as higher doses. There were no toxic symptoms. After the patients had become afebrile, tablets were given by mouth to complete a course of 21 tablets in all. *Norman White*

CANET, J. Premiers essais de traitement curatif du paludisme aigu en Cochinchine. Par un nouveau médicament synthétique la Nivaquine C ou 3.038 R.P. [**First Trials of a New Synthetic Drug, Nivaquine C or 3,038 R.P., in the Treatment of Acute Malaria in Cochin-China.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 7/8, 527–32.

These observations were made in the Quanloi Hospital, Honquan. Twenty patients were treated, 2 Europeans and 18 indigenous agricultural workers who had come originally from Tonking but who had all been long employed on rubber estates in this hyperendemic malarious region. Most of the patients had marked splenic enlargement. All had been admitted to hospital with high fever and parasitaemia, 18 *P. falciparum*, 2 *P. vivax*. The drug was given in tablet form each containing 0·1 gm. of the base. Fourteen of the patients received 3 tablets a day, two patients 4 tablets a day, and four 5 tablets a day. Fever ceased in the majority of the cases on the second or third day; parasites disappeared on the third or fourth day. Schizonts of both *P. falciparum* and *P. vivax* were equally susceptible to the action of the drug, but the gametocytes of *P. falciparum* were unaffected. A daily dose of 0·30 gm. is adequate and a 5- or 6-day course of treatment is sufficient for an attack of average intensity. No symptoms of drug intolerance were ever noted. Nivaquine C is as effective as quinacrine and appears to act more rapidly. It should be of value for mass prophylaxis [see also this *Bulletin*, 1949, v. 46, 15]. *Norman White*

SOHIER, R., GREGOIRE, J. & RANC, A. Traitement du paludisme à *Pl. vivax* par le dichlorhydrate de méthyl 3 (diéthyl amino-pentyl) amino-4-chloro-7-quinoléine (3038 R.P. ou Nivaquine C) et le sulfate neutre de (diéthyl-amino-pentyl) amino-4-chloro-7-quinoléine (3377 R.P. ou Nivaquine B). [**Treatment of *P. vivax* Malaria with Nivaquine C and Nivaquine B.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 7/8, 482–5.

The 48 patients with *P. vivax* malaria who were treated with either Nivaquine C or B had mostly returned from Indochina where they had suffered from previous attacks. Both drugs were very effective in arresting fever and other symptoms. The dose of 0·5 gm. a day for five days was well tolerated. Splenomegaly was notably reduced in 45 per cent. of cases during this five-day treatment. Of 21 patients who were kept under observation for periods of from 2 to 7 months 4 relapsed. *Norman White*

SCHNEIDER, J. & CARUANA, M. Essais de traitement curatif du paludisme par la sulfaméthyldiazine (Sumédine). [**Treatment of Malaria with Sulphamethyldiazine.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 7/8, 478–81.

This reports the treatment of 14 patients suffering from malaria with sulphamethyldiazine. The dose for adults given was generally 3 or 4 gm. a day for 4 days or more. In 4 of 6 patients with *P. falciparum* infections satisfactory results were obtained. In 6 of 8 patients with *P. vivax* the treatment was without effect. As an antimalarial drug sulphamethyldiazine is in every way inferior to the usual remedies. *Norman White*

AINLEY, A. D., CURD, F. H. S. & ROSE, F. L. **Synthetic Antimalarials. Part XXXIII. An Alternative Route to N^1-Aryl-N^5-Alkyldiguanides and Related Compounds : the Condensation of Guanidines and Cyanamides.** *J. Chem. Soc.* 1949, Jan., 98–106.

GAGE, J. C. **Synthetic Antimalarials. Part XXXIV. Physicochemical Studies on the Diguanides.** *J. Chem. Soc.* 1949, Jan., 221–6, 4 figs.

BENNETT, G. M., CROFTS, P. C. & HEY, D. H. **Synthetic Antimalarials. Part XXXV. Further Arylaminodialkylaminoalkylaminoquinoline Derivatives.** *J. Chem. Soc.* 1949, Jan., 227–32.

MADINAVEITIA, J. & RAVENTÓS, J. **Antimalarial Compounds as Antagonists of Adenosine.** *Brit. J. Pharmacol. & Chemotherapy.* 1949, Mar., v. 4, No. 1, 81–92, 4 figs. [26 refs.]

"Antimalarial compounds antagonize the action of adenosine on the guinea-pig heart and on the hen caecum.

"A parallelism between the antimalarial activity and the power to antagonize adenosine has been demonstrated in most series of compounds examined.

"In heart-lung preparations it has been found that unlike the other antimalarials tested paludrine does not antagonize the action of adenosine. However, the blood of paludrine-treated guinea-pigs did antagonize this action. This is taken as evidence that paludrine is metabolized to another compound with different pharmacological properties.

"The considerations which led to the testing of antimalarials as antagonists of adenosine are discussed."

LINDUSKA, J. P. & MORTON, F. A. **Tests of the Permeability of Fabrics to Biting by Mosquitoes.** *J. Econom. Entom.* 1948, Oct., v. 41, No. 5, 788–94.

Laboratory and field investigations were made at Orlando, Florida, into the permeability to mosquito bites of cloths of different weaves ; of washed and unwashed fabrics ; of several styles of gloves ; of certain highly permeable fabrics when lined with various nettings ; of fatigue suits made of different materials and of different types of flying suits.

The mosquitoes used in the laboratory tests were *Aëdes aegypti* and *Anopheles quadrimaculatus*. A mosquito cage was specially designed to fit on the thigh above the knee for some of the tests ; for others an arm cage was used. In testing the suits in the field, the salt-marsh mosquito *Aëdes taeniorhynchus* was available in large numbers.

The results are summarized in six tables and show that of fifty-six fabrics tested, twenty-one of them allowed fewer than five per cent. of the mosquitoes to penetrate, nine being practically impervious as only one per cent. of the mosquitoes succeeded in biting through them. A number of these tests were confirmed in the field, the best materials being Byrd cloth, nylon filled poplin, Jo cloth, heavy nylon and one style of cotton twill. Suits made of these materials provided good protection against mosquito bites. Washing of the fabrics made no significant difference to their permeability.

Mosquito-biting through highly permeable fabrics was eliminated or reduced when coarsely woven, open-mesh netting was worn underneath, and in some cases gave better protection than some of the most resistant fabrics when worn alone. *H. S. Leeson*

LEWIS, D. J. **The Extermination of *Anopheles gambiae* in the Wadi Halfa Area.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Jan., v. 42, No. 4, 393–402, 4 figs. & 1 map. [17 refs.]

This paper should be read together with that by SHOUSHA [this *Bulletin*, 1949, v. 46, 438] on the eradication of *Anopheles gambiae* from Egypt, as it completes the story of the disappearance of that mosquito from its northernmost extension and adds considerably to the discussion of how it came to travel so far.

At the end of the Egyptian scheme a similar campaign was carried out in the neighbouring part of the Sudan. In the winter of 1945–46 *A. gambiae* was eradicated from the 90-kilometre stretch of the Nile Valley between Faras (a border town at 22° 22′N) and Saras (21° 36′N) by a campaign based on hand distribution of 1 per cent. paris green mixture to all potential breeding places. Work was simple, rapidly effective, and undertaken by a staff of 17 men. Proof of eradication is given by the fact that there has been no reappearance in 21 months since most larvicidal work was abandoned, during the last 13 of which it has been entirely abandoned and conditions have been unusually favourable for breeding.

The work was intended mainly to provide a barrier to future invasions of Egypt by *A. gambiae* as it brings eradication back to a natural barrier of a long stretch of valley where there are few opportunities for breeding. The author considers that this mosquito is native to the whole Nile Valley in the Sudan and perhaps to a part of Egypt, and claims the work as the first instance of the extermination of this species in an area of the Ethiopian zoogeographical region where it has occurred for many years.

[This claim does not rest on quite secure ground as the evidence for the natural distribution of *A. gambiae* is circumstantial, and both the extent and the means of its extension are conjectural. In 1938 it was not recorded north of Merowe (18° 29′N). In 1941 it was found at Wadi Halfa (21° 53′N) and in 1942 up to Assiut (27° 0′N) in Egypt. There have been several records of malaria epidemics before this time within these limits. So far as the Sudan is concerned the argument is that *A. gambiae* has long been present throughout the whole length of the Nile Valley in that country, but had not been reported because it had not been sought, most of the country being desert and many parts of the valley quite inaccessible. However, past epidemics show its previous presence as there are no other effective carriers. But *A. multicolor* is recorded as occurring. So far as Egypt is concerned, the argument is that invasion is recent, importation being by boats, and past epidemics are attributable to favourable breeding conditions for other species such as *A. multicolor*. The matter is one of considerable interest and cannot be considered settled.] *G. Macdonald*

BRISOU, J., CASTET, A. & AUTHEMAN, R. Expérimentation d'un nouveau produit antilarvaire. [**Experiments with a New Anti-Larval Preparation.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 7/8, 485–7.

" Gyron " is a yellow powder consisting of very finely ground cork in which is incorporated 5 per cent. DDT. The preparation floats on the surface of water for about three weeks and collects among the grass and rushes along the borders of marshes, favoured places for mosquito breeding. Laboratory tests and practical experiments on vast areas of marsh have shown it to be an excellent larvicide, in doses less than 2 gm. per square meter. Pupae are not destroyed, but the imago dies soon after its emergence. Aeroplane dusting with this material from a low-flying Tiger Moth has been used over extensive swamps near Ferryville, Tunisia. In Tunisia larvae begin to reappear eighteen days

after treatment, which should then be repeated. Water thus treated is toxic neither for domestic animals, nor for fish, amphibians nor the microfauna of ponds and marsh. This larvicidal measure together with DDT spraying of houses has resulted in almost the total disappearance of mosquitoes from the areas treated. *Norman White*

MALAYAN UNION. **Annual Report of the Malaria Advisory Board for the Year 1947 (including also 1945 and 1946)** [MACGREGOR, R. B., Chairman]. 24 pp., 6 charts. 1948. Kuala Lumpur: Govt. Press. [1$ or 2*s*. 4*d*.]

The Board was first formed in 1911 with the object of co-ordinating the activities of estate owners, Government, and private individuals, and took a large part in shaping the progress of malaria control in Malaya until its dissolution in 1941. It was reconstituted at the end of 1945 and has resumed its previous functions; this report briefly reviews the changes in the malaria situation during and since the Japanese occupation.

There was a great increase in malaria in 1942 and 1943, followed by an ostensible decrease in 1944, probably because the people saw the futility of attending hospitals where no drugs were obtainable. There has been a marked decrease since the end of the war, partly owing to the fact that 1947 was a naturally healthy year but equally to the re-institution of control measures, the efficacy of which is now being reconsidered. The relative value of the various new methods of control is not yet clear. The one method which has been subjected to adequate trial is the use of proguanil (paludrine) and SN 7618 [chloroquine], with the aid of a grant from United Kingdom funds. A dose of 100 mgm. proguanil once a week has not been found effective, but doses of 200 to 250 mgm. once a week have given effective suppression in most people, with "break-throughs" confined to children, and there has been no recorded failure of 300 mgm. once a week. A single weekly dose of 250 mgm. SN 7618 has about the same value, and one weekly dose of 300 mgm. mepacrine compares in efficacy with 100 mgm. proguanil. Used therapeutically, a single dose of 300 mgm. proguanil effects a clinical cure in *Plasmodium vivax* and *P. malariae* infections, and in moderate infections with *P. falciparum*. A course of 300 mgm. daily for five days cures all types except those pernicious *P. falciparum* infections which require parenteral treatment. Used in this way proguanil is comparable with mepacrine.

Preliminary experiments have been carried out with DDT and Gammexane as residual insecticides with promising but not yet convincing results. The nature of the breeding places in which *Anopheles maculatus* larvae occur makes it unlikely that much benefit can be derived from the larvicidal properties of these insecticides, though their possibilities are being explored.

[The Board took a pioneer part in fostering malaria control for thirty years before the recent war. Its successful reconstitution will be welcomed by all interested in the subject.] *G. Macdonald*

REID, J. A. **D.D.T. :—A Review of its Possibilities for Public Health Work in Malaya.** *Med. J. Malaya.* 1948, Dec., v. 3, No. 2, 105–27. [62 refs.]

MCCAULEY, R. H., Jr., FAY, R. W. SIMMONS, S. W. **A Comparison of the Residual Effectiveness of certain Insecticides against** *Anopheles quadrimaculatus*. *J. National Malaria Soc.* 1948, Dec., v. 7, No. 4, 294–9.

The residual effectiveness of three insecticides, DDD, Chlordane, and chlorinated camphene was compared with DDT. The following spray combinations were used :—

(1) 5 per cent. DDT-xylene emulsion
(2) 5 per cent. DDT suspension from 90 per cent. DDT water-wettable powder
(3) 5 per cent. DDT suspension from 50 per cent. DDT water-wettable powder
(4) 5 per cent. DDD (dichlor-diphenyl-dichlorethane)-xylene emulsion
(5) 5 per cent. Chlordane-xylene emulsion
(6) 5 per cent. Chlordane-kerosene emulsion
(7) 5 per cent. chlorinated camphene-xylene emulsion
(8) 5 per cent. chlorinated camphene suspension from 25 per cent. chlorinated camphene water-wettable powder.

Laboratory-bred *Anopheles quadrimaculatus* 3–4 days old were set free in rooms, the walls and ceilings of which had been sprayed with 200 mgm./sq. ft. of insecticide, and the rate of knockdown was recorded. Regular tests were made from two weeks after spraying up to seven months.

DDT was shown to be more effective than the other insecticides. Tests in which 5 per cent. DDT xylene emulsion or DDT suspension from 90 per cent. water-wettable powder were used gave similar results, but the DDT suspension from 50 per cent. water-wettable powder was less effective both in knockdown and residual action. It is suggested that this difference is due to a masking effect by inert ingredients.

Chlordane was as effective as DDT during the first three months, but thereafter its effect was not so great. Chlordane-kerosene emulsion gave a more rapid initial knockdown than chlordane-xylene emulsion.

DDD gave a slow rate of knockdown and a lower kill after four hours than DDT or chlordane, but it was more effective than chlorinated camphene which was found to have comparatively little residual effect. *C. M. Harrison*

QUARTERMAN, K. D. **Some Factors influencing the Residual Effectiveness of DDT and Chlordane in Anopheline Mosquito Control.** *J. National Malaria Soc.* 1948, Dec., v. 7, No. 4, 300–306.

The factors examined were :—

(1) dosage ;
(2) retreatment of surfaces ;
(3) the effect of furniture in treated rooms.

(1) The experiments were carried out in houses of concrete block construction. Previously untreated rooms of uniform size were sprayed with xylene-Triton-x-155 emulsions of DDT or chlordane at the rates of 200, 400, 800 mgm./sq. ft. The knockdown of insectary-reared *Anopheles quadrimaculatus* released into these rooms was recorded at intervals of 30 minutes over a period of 4 hours. Test releases of mosquitoes were made every 1½ months over a period of 6 months.

There was no striking difference in the results with different dosages of DDT, but DDT applied at 200 mgm./sq. ft. was superior to chlordane in its residual effect. A dosage of 800 mgm./sq. ft. of chlordane when freshly applied was more effective than the same dosage of DDT. The author suggests that this is due to the strong fumigant action of chlordane.

(2) The effect of re-treatment was tested by applying 200 mgm./sq. ft. of DDT or chlordane to a surface which had received the same treatment 3 months previously. Knockdown was achieved more rapidly than with a single treatment but there was little difference in the results with re-treatment at 200 mgm./sq. ft. and a single treatment of 400 or 800 mgm./sq. ft.

Rooms treated in 1946 with 200 mgm./sq. ft. of DDT or chlordane were re-treated in 1947 with 50, 100, 200 or 400 mgm. insecticide per sq. ft. The toxicity was restored approximately to the original value, but there was no cumulative effect.

(3) A higher percentage knockdown was obtained in treated rooms without furniture than in rooms with either treated or untreated furniture. Rooms with furniture treated at 200 mgm./sq. ft. proved more effective than rooms with untreated furniture, or furniture treated at any other rate.

C. M. Harrison

DUBIN, I. N. **Hypersensitivity in Simian Malaria.** *J. National Malaria Soc.* 1948, Dec., v. 7, No. 4, 265–74. [12 refs.]

This paper represents an attempt to demonstrate hypersensitivity in monkeys, infected with simian malaria, to various artificially produced malarial antigens. The monkeys used belonged to the species *Macaca mulatta* (spelt *Macacca*) and comprised 26 normal monkeys, 5 infected with *Plasmodium cynomolgi* and 16 infected with *P. knowlesi*.

Five antigens prepared from *P. knowlesi* were used. The basis of four of these was a mass of dried parasites obtained by haemolysing the red cells of a parasitized monkey with distilled water, repeatedly washing the parasites in the same and drying them in a vacuum.

Antigen I was prepared by powdering the dried parasites and making a 1 per cent. suspension in distilled water.

Antigen II was an extract of the dried parasites made by exposing 1 part to 100 parts of distilled water for one hour at room temperature and using the supernatant fluid.

Antigen III was a similar extract used after keeping the mixture in a refrigerator for 24 hours.

Antigen IV was made by extracting one part of dried parasites with 40 parts of Tyrode's solution followed by repeated freezing in dry ice and alcohol, and thawing.

Antigen V was prepared by dissolving the mass of wet parasites in 0·1 N NaOH (1 gm. of parasites to 25 cc.) and neutralizing the solution with dilute phosphoric acid to bring the *p*H to about 8·0.

The control antigen was " a 1 in 100 extract, in distilled water, of haemolysed erythrocytes from normal monkeys."

In the case of *P. gallinaceum*, Antigen I was the "Malarial Antigen (Dried)" of the Lederle Laboratories. A 1 in 100 suspension was used in distilled water.

Antigen II was a 1 in 100 extract in distilled water of the dried antigen kept at room temperature for 1 hour, the supernatant fluid being used after settlement. The control antigen was a 1 in 100 suspension in distilled water of the dried material obtained from haemolysed blood of normal chickens.

In testing these antigens, 0·1 cc. was inoculated intracutaneously. Readings were made at intervals of ½, 24, 48 and 72 hours after inoculation. In all cases the maximum response was obtained between 24 and 48 hours. The most significant results were obtained with *P. knowlesi* Antigen I.

Twenty-six normal monkeys showed a skin reaction averaging 3·7 mm. in diameter and never more than 5 mm.

In tests on 5 monkeys infected with *P. cynomolgi*, one gave a reaction of 8 mm. in diameter, two gave 7 mm., and two 5 mm., the reaction diminishing with the time which elapsed after the date of infection. The results were said to be statistically highly significant. [Whether this assumption is justifiable

on such small numbers is debatable, especially where the measurements between the normal upper limit of 5 mm. and the maximum limit in infected animals of 8 mm. showed a difference of 3 mm. only.]

The tests done on monkeys infected with *P. knowlesi* were even less convincing, although here the species homologous to the antigen was being tested. In the case of these tests, on a total of 41 monkeys tested, the mean diameter of the reactions never reached 6 mm. The results obtained with the remaining *P. knowlesi* antigens are detailed in tables. In all these the numbers of test animals are small and the results even less convincing.

The results with *P. gallinaceum* antigen are also given in tables, but show little significance. Attempts to enhance the sensitization of infected animals by the use of various adjuvants were unsuccessful, as were attempts to demonstrate sensitization of macrophages *in vitro*.

[The general results of this work are not easy to evaluate. The small numbers of test animals used has been remarked upon and no indication is given of the means used for measurement of the reactions. This is important where fractions of a millimetre are given. The small margin between the diameters of the reaction in normal and test animals where the greatest reaction in the latter is only 8 millimetres and the normal may be as high as 5, obviously leaves many loopholes for error both in making measurements and in drawing inferences from them.] *H. E. Shortt*

HARRIS, A. & REIDEL, L. M. **Evaluation of the Complement Fixation Test for Malaria.** *Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 787–95.

The title is a little misleading as the paper is an account of complement fixation tests in malaria carried out by the authors themselves rather than an evaluation of the test in the light of previous work on the subject.

Merthiolated serum from sporozoite-infected donors, supposedly normal serum from students and serum from donors suffering from tuberculosis or syphilis, were the materials used in the tests. The Kolmer complement fixation test was employed, the antigens used being dehydrated corpuscle masses from monkeys infected with *Plasmodium knowlesi* and chickens with *P. gallinaceum*.

As the functioning of the test is largely dependent on the potency of the antigen, the relative efficiency of these two antigens was first tested. Two *gallinaceum* and two *knowlesi* antigens were tested on 629 sera from sporozoite-infected donors, while human, monkey and chicken red cell stromata were used as control antigens.

The results showed extreme variability not only between the different antigens but between different lots of the same type of antigen. Thus, the same serum might give a strongly positive reaction and a strongly negative reaction with different antigens and there were other equally disconcerting results. In these tests, the *gallinaceum* antigens were decidedly more sensitive than the *knowlesi* antigens.

In another series of tests on 224 sera from the same series, the *gallinaceum* antigens again showed a higher proportion of positive results than the *knowlesi* antigens while in a third series of 31 similar sera, this result was reversed and a *knowlesi* antigen gave the higher number of positive reactions. The lower dilutions of antigen gave the greater number of positive reactions.

When the results of complement fixation tests were compared with the results of examination for parasites in the blood, equivocal results were obtained. Thus, the presence of malaria parasites in the blood was associated with both negative and positive complement fixation tests.

The specificity of the complement fixation test was next tested on 961 bloods from supposedly non-malarial donors, with both *gallinaceum* and *knowlesi*

antigens. The results went to show that less than 1 per cent. of false positive results was obtained so that the test could be regarded as highly specific so far as the positive results were concerned. Further evidence to this effect was obtained with sera from tuberculosis and syphilitic patients.

The general conclusions to be drawn from the investigation are the necessity for the production of a standard antigen of constant potency, the fact that *gallinaceum* antigen appears to be the more reliable as well as the more specific antigen, and the fact that the complement fixation test in its present form is no substitute for the finding of malarial parasites in blood films as a means of diagnosis. *H. E. Shortt*

BLACKWATER FEVER

JONCHERE, H., AUFFRET, C. & RAOULT, A. Un nouveau cas d'anurie prolongée au cours d'une fièvre bilieuse hémoglobinurique. [**A Case of Prolonged Anuria during Blackwater Fever.**] *Bull. Méd. de l'Afrique Occidentale Française.* 1947, v. 4, No. 4, 405–13.

A long account is given of the clinical and pathological findings in a case of haemoglobinuria occurring in a European patient employed for 25 years in French West Africa and with a long history of chronic malaria. The haemoglobinuria appeared eight days after a heavy course of sulphathiazole treatment for chronic urethral discharge. A diagnosis of blackwater fever was made. The patient was oliguric from the beginning and rapidly became anuric. He died after a blood transfusion on the sixteenth day of his illness. Three days before death 432 " grammes " of urine containing traces of sulphonamide were removed by catheter. The following day he passed 1,100 cc. of urine which had a low urea concentration and contained traces of blood pigments, many casts and some blood cells. Vigorous treatment was administered, which included intralumbar infiltration with novocaine, intravenous novocaine, and intensive intravenous vitamin C dosage. (The vitamin was given because of its antihistamine activity in high dosage.)

Autopsy was performed immediately after death and the lesions of the organs, including the kidneys and liver, are discussed. The renal lesion was regarded as a toxi-infectious nephritis with extreme epithelial damage and heavy deposits of haemoglobin-pigmented material in the lumina of the tubules. There was considerable inflammatory infiltration. Crystals resembling those of sulphathiazole were also present in the tubules. In the liver the centrilobular veins and attendant capillaries were dilated and engorged and there was fatty degeneration in the cells of the centrilobular region. The Kupffer cells contained malarial pigment and there was a great deal of haemosiderin in the hepatic cells.

The authors suggest that the high dosage of sulphonamide might have influenced the development of lysis in the patient already heavily infected with malaria. *B. G. Maegraith*

CARAYON, A. Les formes anuriques de la fièvre bilieuse hémoglobinurique. Bases cliniques, anatomo-pathologiques et physiopathologiques du traitement. A propos de quatre cas personnels. [**Anuria in Blackwater Fever ; Clinical, Anatomical and Physiological Basis of Treatment in Four Cases.**] *Méd. Trop.* Marseilles. 1948, July–Aug.–Sept.–Oct., v. 8, No. 4, 432–50.

In three years at Conakry the author observed six anuric cases of blackwater fever, four of which were treated by surgical interference, including

decapsulation of the kidneys and infiltration of the renal pedicles with novocaine. The six anuric cases occurred in a total of 25 European cases, of which six others were polyuric. Other cases of blackwater fever, details of which are not discussed, were seen in Africans and in Lebanese. All European cases occurred in patients over the age of 30 and were associated with malaria treated with quinine.

The four cases which were treated surgically are dealt with fully, and detailed notes are given. These cases were all oliguric from the first appearance of blackwater. Anuria, defined as the passage of less than 50 cc. of urine in 24 hours, developed within two days in all of them. Blood non-protein nitrogen (NPN) was high by the time of development of anuria. Another constant feature was the low urea concentration in the urine. Oliguria occurring early, accompanied by a reduction in urinary nitrogen and a rising blood NPN indicated increasing renal damage, which was concomitant with the haemoglobinuria and signs of liver failure. The author regards these cases as examples of the hepato-renal syndrome.

Apparently autopsies were not performed but at operation in two cases the kidneys were found to be enlarged, firm and congested.

There is a long and interesting general discussion on the pathogenesis of renal failure in blackwater fever. The mechanical blockage theory is discussed and the conclusion is reached that it cannot explain the appearance of anuria. Other possible mechanisms are considered.

The author concludes that there are two predominant factors concerned in the pathogenesis of the renal damage, their relative importance depending on the circumstances of the individual case. The first of these factors is toxi-infectious and results from the malarial infection; it produces renal changes often associated with the hepato-renal syndrome. The other factor is tissue anoxia. Its importance is variable and depends upon the two elements which make it up, *viz*, (*a*) anaemia, which is more or less intense and dependent upon the malarial infection and haemolysis, and (*b*) vasomotor disturbances in which the intrarenal capillary pressure is affected. The author considers that the rôle of tissue anoxia in blackwater fever anuria has been over-estimated by Anglo-Saxon authors, possibly because of its importance in post-transfusional and crush syndrome anuria, where the appearance of shock is of more importance than in blackwater fever. In the four cases described by the author, shock was absent. In these cases he regards anaemia as being the more important in the production of tissue anoxia, since malarial anaemia presumably preceded that of the blackwater fever. He believes that this explains the inconstant effect on blackwater fever anuria of the surgical therapeutic measures described, measures which are more effective in crush syndrome and post-transfusional anuria, in which the vasomotor element is more obvious. No evidence of increased intrarenal pressure was found in his cases.

Theoretically, treatment of the individual case would depend upon the importance or otherwise of the vasomotor factor. If this were considerable, infiltration of the renal pedicles and decapsulation of the kidneys would probably produce good diuresis. Where tubular epithelial lesions were severe, the relief of the vasomotor effect by infiltration and decapsulation would restore diuresis but the urine would be poorly concentrated. Where severe tubular lesions and pronounced vasomotor states co-existed and operation was performed late, the results would be unsatisfactory.

There is a detailed discussion of the treatment of anuric cases in general. The author points out that it may be dangerous to attempt intensive alkali therapy and suggests that the anaemia, which in his view is the main cause of tissue anoxia, should be treated with liver extract and transfusion. Repeated inhalation of oxygen may also help in attempting to control tissue anoxia.

Malaria should be treated and antimalarial drugs given parenterally in the first instance. In the treatment of anuria he advises against the use of diuretics. He recommends injections of plasma and physiological saline in moderate doses ; hypertonic serum saline may be dangerous in the anuric period. Intravenous injection of novocaine, which has given very successful results sometimes in anuria produced by sulphonamides, may be tried but the author prefers infiltration of the renal pedicles with novocaine, with the object of releasing sympathetic vaso-constrictor activity, which may be responsible for the tissue anoxia. The technique of various surgical procedures is briefly described.

[This paper should be read in the original by those interested in the subject. In general the author's conclusions are in agreement with those of recent authors in the Anglo-Saxon world.] *B. G. Maegraith*

TRYPANOSOMIASIS

FERREIRA, F. S. da C. As tripanosomíases nos territórios africanos portugueses. África Ocidental (Angola e Guiné). Africa Oriental (Moçambique). **[The Trypanosomiases in Portuguese African Territories. West Africa (Angola and Guinea). East Africa (Mozambique).]** 52 pp., 12 folding maps (2 coloured). In Portuguese and English. 1948.

In Angola and Portuguese Guinea, sleeping sickness is more important than animal trypanosomiasis, while in Mozambique the reverse is the case ; the difference is associated with the nature of the country, the density of population, and the species of tsetse flies which transmit the infections. In all three colonies information is incomplete and further investigations and control measures are being planned and organized.

Angola.—Sleeping sickness (*Trypanosoma gambiense*) is almost limited to the area north of Lat. 12°S. though there are a few endemic foci further south ; in the Congo Province, the chief centre of infection, 3,503 cases were diagnosed in 1947. Domestic stock of all kinds totals nearly 2 millions ; infections with *T. brucei*, *T. congolense* and *T. uniforme* occur but most of the animals are kept in the tsetse-free southern part of the colony. Tsetse flies infest about one-third of the country, chiefly in the north ; *Glossina palpalis* (with the varieties *wellmani* and *fuscipes*) is the commonest species and *G. morsitans*, *G. pallicera*, *G. fusca*, *G. schwetzi*, *G. brevipalpis* and *G. longipalpis* also occur. Measures against trypanosomiasis include diagnostic surveys of the population and treatment with drugs, periodical inspection of animals with slaughter or treatment of those infected, a certain amount of clearing of vegetation, and destruction of game. The service forms part of the Public Health Service.

Portuguese Guinea.—Conditions in the central and southern parts are not well known but in the west and east, in the areas surveyed, sleeping sickness (*T. gambiense*) is pretty generally distributed, the incidence being higher in the west than in the east. Trypanosomes were found much more frequently by gland puncture than by blood examination, the proportion in 427 patients examined by both methods being 7·5 : 1. Many cases were in the nervous stage—53 per cent. in the west, 88 per cent. in the east. In the west, where there are large tidal estuaries and mangrove swamps with evergreen vegetation, the population is much exposed to *G. palpalis*, while in the east, where the climate is drier with open bush and forest vegetation and where *G. morsitans* is present, contact of man with tsetse flies is less, though *G. palpalis* also occurs near the rivers. Domestic stock of all kinds totals about 334,000 ; infection with

T. congolense, *T. vivax*, *T. brucei* and *T. theileri* occur and it is noteworthy that *T. brucei* was found in monkeys (*Cercopithecus aethiops*) of the mangrove swamps [*T. brucei* is omitted in the English translation which includes monkeys among animals infected with *T. vivax*] ; a further report by the veterinary staff will shortly be published.

Four species of tsetse flies—*G. palpalis*, *G. submorsitans*, *G. longipalpis* and *G. fusca*—are present, the first being much the commonest and the last the rarest. Polymorphic trypanosomes were found in 2·7 per cent. of 2,632 tsetse flies examined. Other blood-sucking flies identified were : species of *Tabanus* —*biguttatus*, *brucei*, *distinctus*, *gratus*, *nigrostriatus*, *nyase*, *par*, *taeniola*, *variabilis* ; *Chrysops distinctipennis* and *C. longicornis* ; *Haematopota decora*, *H. lacessens*, and *H. mactans*.

A delegation of the Lisbon Institute of Tropical Medicine forms a permanent sleeping sickness service and has three sections : (1) for investigation ; (2) for diagnosis and treatment of sleeping sickness ; (3) for combating tsetse flies.

Mozambique.—There are only about 200–300 cases of sleeping sickness (*T. rhodesiense*) a year and they occur in somewhat isolated foci. Domestic stock of all kinds amounted in 1945 to nearly 1 million of which about 600,000 were cattle. In the areas important for cattle breeding, infections with *T. congolense* alone are the most *widespread*, mixed infections with *T. congolense* and *T. vivax* come next, pure infections with *T. vivax* are infrequent, and *T. brucei* infections are very rare ; a few infections with *T. simiae* have occurred. Tsetse flies infest about three-quarters of the colony ; the four species present are *G. morsitans* (the most important), *G. pallidipes*, *G. brevipalpis* and *G. austeni*. Mechanical transmission by other blood-sucking flies is also thought to be important. The area of Maputo [see HORNBY, this *Bulletin*, 1948, v. 45, 1068] is ideal for cattle breeding and has therefore been specially studied ; the relative frequency of occurrence of pathogenic trypanosomes was : *T. vivax* 66·84 per cent., *T. congolense* 15·76 per cent. and mixed *T. vivax* and *T. congolense* 17·4 per cent. [these figures seem to conflict with the statement given above]. *G. brevipalpis* and *G. austeni* are present as well as other blood-sucking flies —*Tabanus*, *Haematopota*, *Stomoxys* and members of the family Hippoboscidae.

The trypanosomiasis service is controlled by a Council formed from the Health, Veterinary and Agricultural Services, the Department for Native Affairs, and the Mission for the Fight against Trypanosomiases ; the last-named is the executive body and consists of medical, veterinary and entomological sections. Clearing of vegetation is being done in several areas, DDT and gammexane are used, some destruction of game has been carried out, and infected people and animals are treated ; phenanthridinium proved to be the best drug for animal trypanosomiasis [Antrycide is a later discovery].

Game reserves.—In Angola there are 7 game reserves in tsetse-free areas, in Portuguese Guinea there is 1, and in Mozambique there are 5, but in the last colony freedom from tsetse flies is difficult to maintain. *J. F. Corson*

NORTHERN RHODESIA. **Game and Tsetse Control Department. Annual Report for the Year 1945** [VAUGHAN-JONES, T., Acting Director]. 15 pp. 1946. Lusaka : Government Printer.

——. **Annual Report for the Year 1946** [VAUGHAN-JONES, T., Director]. 19 pp. 1947.

——. **Annual Report for the Year 1947** [VAUGHAN-JONES, T., Director]. 16 pp. 1948.

Reference has already been made [this *Bulletin*, 1948, v. 45, 879] to an interesting administrative arrangement in Northern Rhodesia. As the main

tsetse problem relates to *G. morsitans*, it is closely connected with game. The Government views the whole subject of game (both conservation and destruction) as it affects the economic needs of the country and for convenience adds Fisheries. The three subjects are administrated by one department.

The three annual reports give much detail of considerable interest. One notices that human sleeping sickness (*T. rhodesiense*) has a tendency to persist in certain spots, for instance an area east of Fort Jameson. Here *G. morsitans* has been attacked, successfully it seems, by discriminative clearing and the destruction of game. Much of the land has been resettled in a carefully planned way and the success of the whole measure is shown by the fact that in some places the people have cattle. Another of these centres of sleeping sickness is the Feira District in the south-east. The situation here continues to give some anxiety and the human population has been withdrawn from a part of it.

It is noted that extensive use is made of roadside clearings to reduce the number of tsetse carried by vehicles. It is of course only a partial measure for it would be almost impossible to make a clearing so wide that no tsetse would come out to the road : but it appears to be valuable.

The southern limit of rinderpest is at present, roughly speaking, the boundary between Tanganyika and Northern Rhodesia. In order to prevent the southward spread of the disease an area has been marked off as a cordon, along which game destruction is practised. The spread of rinderpest and the threat to territories further south is of considerable international importance.

P. A. Buxton

LEWIS, D. J. *Glossina tachinoides* **in North-East Africa.** *Bull. Entom. Res.* 1949, Mar., v. 39, Pt. 4, 529–30. [10 refs.]

The tsetse fly, *Glossina tachinoides*, Westwood 1850, is an important vector of trypanosomiasis in parts of West Africa. Although it was reported from Arabia by CARTER (*Brit. Med. J.* 1906, Nov., 17, 1393) as long ago as 1906, this finding, as the present author observes, has been questioned by other workers "as a dubious record to be accepted with caution." In any case, the gap in its distribution between West and East Africa is considerable. In 1939, GHIDINI [this *Bulletin*, 1940, v. 37, 401] reported *G. tachinoides* from the Gambeila district of Western Ethiopia which borders on the Anglo-Egyptian Sudan.

The present writer now reports on a single female specimen of *G. tachinoides* found by Dr. Bloss of the Sudan Medical Service at Kigille (8°, 42′ N. ; 34°, 04′ E.), which borders on the Gambeila district. Kigille is a remote police post on a stream flowing from the Ethiopian hills towards the swamps of the Nile valley : it is difficult to reach at most times of the year. The fly was found when biting the collector near a pool in the stream bed. This is the first record of this species in the Anglo-Egyptian Sudan, although many collections have been made of *G. palpalis*, subsp. *fuscipes* and *G. morsitans*.

The gap in distribution of *G. tachinoides* includes swamps of the Sadd region, unsuitable for tsetse flies, but also a large area to the west through which flow many tsetse-infested tributaries of the Nile system. It is not known why this species is not present in these tributaries : but the author notes that many insects in the Sudan show great discontinuity in distribution, probably owing to past climatic changes.

H. J. O'D. Burke-Gaffney

See also p. 514, GORDON & CREWE, **The Mechanisms by which Mosquitoes and Tsetse-Flies obtain their Blood-Meal.**

LAPEYSSONNIE, L. Un cas exceptionnel de pan-chimio-résistance chez une trypanosomée. [**Pan-Chemoresistance in a Case of Sleeping Sickness.**] *Bull. Soc. Path. Exot.*, 1948, v. 41, Nos. 9–10, pp. 613–20.

The author reports two cases of long-standing sleeping sickness infection which were remarkably resistant to repeated courses of treatment by a variety of arsenicals (atoxyl, tryparsamide, and orsanine), by suramin, and by tartar emetic. One of these infections lasted for 8 years, and its course and treatment are described in considerable detail. The other lasted for 12 years, and is merely mentioned. The patients were exceptional among 46,878 diagnosed in a sector of the Pagouda area of Togo.

The case which is described in detail is of a girl first diagnosed in July 1938 when she was 4 years old. Trypanosomes sometimes reappeared, after a temporary remission, even during an actual course of arsenical treatment. In about six years the patient had received, per 20 kgm. body weight, a total of 40·15 gm. of various arsenicals, 16·8 gm. suramin and 4·6 gm. tartar emetic. She was then given several courses of pentamidine injections, and by about April 1947 the infection finally appeared to be sterilized. [Eventual sterilization is attributed to the pentamidine treatment, but this seems unlikely, since the dosage reported was minute—0·003 mgm. per kgm. for the first two courses of injections, followed by 1·0 mgm. per 25 kgm. for two later courses.]

The patient was subjected to 27 lumbar punctures between 1938 and 1947, and the cerebrospinal fluid remained normal throughout this period. She always had generalized enlargement of lymph glands, and developed an enlarged heart and systolic murmur, an enlarged tender liver, and crepitant râles at the bases of both lungs. These signs are attributed by the author to myocardial damage consequent on the long-continued infection. Nevertheless, the patient's general condition remained remarkably good.

In an interesting but highly speculative and controversial discussion the author gives his view that the drug-resistance was inherent in the trypanosome and not produced by treatment. He believes that the trypanosome was of animal and not of human origin, on the slender evidence of its drug-resistance, and its predilection for the lymphatico-blood system rather than the central nervous system. He draws attention to drug-resistant sleeping sickness exhibiting the following features :—

(*a*) a strictly delimited geographical localization ;
(*b*) predominance of long forms (32μ) and high incidence of blood infections ;
(*c*) an increasing incidence since 1941 ;
(*d*) relative benignity, cases often remaining in perfect health for 3 years.

The author postulates the theory [hardly acceptable in its entirety] that relatively heavy blood infections, as in these cases, result in a high production of antibodies, which get into the cerebrospinal fluid and protect the central nervous system. When the strain becomes older, either in an individual or in a community, the power of reproduction decreases, antibodies become less numerous, and sero-resistant "biological mutants" are consequently able to penetrate into the central nervous system. Thus, the older a strain is, in the sense of adaptation to man, the less will it tend to be found in the blood and the more neurotropic does it become. In the extreme development along these lines, cases occur in which the lymphatico-blood stage is insignificant and the nervous stages predominate almost from the start, as in the "*grands suspects d'Ebolowa*" [see this *Bulletin*, 1946, v. 43, 1122].

In discussion of this paper, MURAZ questioned whether irregular time-intervals between injections might not have contributed towards production of the drug-resistance described. *E. M. Lourie*

See also p. 549, SENECA, HENDERSON & HARVEY, **Effect of Hyaluronidase and of Hyaluronic Acid on Cultures of Trypanosomes, Leishmania, and Amoebae.**

ROMAÑA, C. Xenodiagnosticos colectivos. Indices de infección por *S. cruzi* de niños en escuelas de Catamarca, Chaco, Formosa, Corrientes y Entre Ríos. [**Incidence of Infection by *T. cruzi* among School-children of Catamarca, Chaco, Formosa, Corrientes, and Entre Rios, as found by Xenodiagnosis.**] *An. Inst. Med. Regional.* Tucuman, Argentina, 1948, Dec., v. 2, No. 2, 185–96, 9 figs. English summary.

In 1946 ROMAÑA and his colleagues reported finding 34 positive (by xenodiagnostic methods) among 146 school-children (23·3 per cent.) in Tucumán, Santiago del Estero and Catamarca [this *Bulletin*, 1947, v. 44, 404]. Since that time other school-children have been tested: 34 in Campo Largo (in Chaco), of whom 3 proved positive. At two schools in Catamarca 15 and 12 children respectively were tested and 2 of each were positive. Here the dwellings are of adobe (sun-dried bricks) with wood and earth roofs, and Triatomidae are to be found in them. In Mercedes, a district in the middle of the Province of Corrientes, 4 were positive out of 63 tested, and 3 out of 69 in Entre Rios. The rate was higher, 9 out of 40, in Formosa, where *T. infestans* was found in large numbers. A spot map indicates the places visited; altogether 233 children were tested and 23 (9·8 per cent.) were positive. It was observed that in the places with higher percentage of infection the dwellings were of a poor standard and the general sanitary conditions bad. *H. Harold Scott*

CONEJOS, M. Cultivo de *S. cruzi* en embrion de pollo. [**Cultivation of *T. cruzi* in Chicken Embryo.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1948, Dec., v. 2, No. 2, 175–83, 5 figs. English summary.

The author recalls that in 1939 ROUBAUD and ROMAÑA inoculated 10 chicken embryos with *T. cruzi*: 5 with a culture, 3 with dejections of *Rhodnius prolixus* rich in *T. cruzi*, and 2 with the blood of an infected guineapig. With the exception of one of the last, in which a trypanosome was found at the end of a week, all were negative. [See this *Bulletin*, 1940, v. 37, 413.]

Now, the author inoculated chick embryos of 10 days' incubation with a glucose-agar liver-broth culture of *T. cruzi* and after 4 days found nests of multiplying trypanosomes in the organs. Better results were obtained if 5–6-day embryos were used, instead of 10-day. Trypanosomes appeared in the circulation from the 10th day after inoculation and remained till hatching. At birth none was found in thin or thick blood film, but xenodiagnosis was positive in one instance on the first day of life. On the 7th day nests of developing trypanosomes were seen in all the organs, heart, liver, spleen, kidneys, glands, muscles, lungs and bone marrow. *H. Harold Scott*

SENECA, H., HENDERSON, E. & HARVEY, Martha. **Purification of Hemoflagellate Cultures with Antibiotics.** *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 41.

"Neither penicillin in 1,000 units and 5,000 units per 5 cc. supernatant overlay, nor similar amounts of streptomycin, nor 5,000 units each of penicillin and streptomycin together had any effect on the vitality and the intensity of the growth of *Leishmania donovani* and *Trypanosoma cruzi*.

"For the purification of contaminated cultures of hemoflagellates, 5,000 units of penicillin and 5,000 units of streptomycin added to such cultures in 5 cc. of saline ordinarily kills all contaminants in the second generation."

MANSO SOTO, A. E. & MARTÍNEZ, A. La colección de triatómidos de la M.E.P.R.A. **[The M.E.P.R.A. Collection of Triatomata.]** *Universidad Buenos Aires : Misión de Estudios de Patologia Regional Argentina. Publicación No. 74.* 1948, 1–18, 5 figs.

ROMAÑA, C. & ABALOS, J. W. Acción del "Gammexane" sobre los triatomideos. "Control" domiciliario. [**Control of Domestic Triatomata with Gammexane**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1948, Dec., v. 2, No. 2, 95–106, 5 figs. English summary.

Preliminary laboratory experiments with Gammexane involved contact of nymphs and adults of various domestic species of *Triatoma* with variable proportions of gamma isomer mixed with inert dusts. One part of Gammexane in 2,000 gave 100 per cent. mortality in twenty-four hours. A surface with 500 mgm./sq. metre Gammexane caused the *Triatoma* to show toxic symptoms and finally to die. DDT was less effective—whereas 100 per cent. mortality of adults could be obtained with DDT, the nymphs were more resistant, only approximately 50 per cent. were killed and this percentage did not increase with increasing concentrations of DDT.

An account of the use of Gammexane as (1) a fumigant and (2) in water mixtures in rural areas in Argentina is given.

(1) The use of smoke generators was found to be ideal for the treatment of houses.

(2) In water suspensions the gammexane used contained 10 per cent. gamma isomer and was made up at the rate of 25 and 50 gm. per litre : a concentration of 500 mgm. Gammexane per sq. metre applied to roofs and walls of dwellings was found to be the most effective. The necessity for treatment of furniture and household goods for complete eradication is emphasized. This treatment gives protection against reinfestation for six months and is excellent for a large scale campaign. *C. M. Harrison*

LEISHMANIASIS

See also p. 549, SENECA, HENDERSON & HARVEY, **Purification of Hemoflagellate Cultures with Antibiotics.**

See also p. 549, SENECA, HENDERSON & HARVEY, **Effect of Hyaluronidase and of Hyaluronic Acid on Cultures of Trypanosomes, Leishmania, and Amoebae.**

PETRISHCHEVA, P. A. [**Sandflies (*Phlebotomus*) in various Landscape Zones of USSR. I. Sandflies in Hot Deserts in Central Asia.**] *J. General Biol.* Moscow. 1946, v. 7, No. 1, 65–84, 4 figs. [15 refs.] [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, Feb., v. 37, Pt. 2, 19.]

In view of the discovery by Latuishev that cutaneous leishmaniasis occurs in natural foci and the probability that visceral leishmaniasis and sandfly fever also do so, the distribution of sandflies (*Phlebotomus*) in their natural habitats has become of epidemiological importance. Investigations were therefore made in the deserts in Turkmenistan, southern Tadzhikistan and Uzbekistan. Most of the work was done in sand desert, loess desert, which is covered with ephemeral vegetation, and stone desert, and little material was obtained from salt desert. The sandflies, which were collected chiefly on sheets of sticky

paper, were very numerous and comprised practically all the species of *Phlebotomus* that occur in Central Asia, but each had its regions of prevalence. They were common in the burrows of gerbilles (*Rhombomys opimus*) and ground squirrels (*Spermophilopsis leptodactylus*) in the sand desert, the burrows of tortoises in the loess desert, and holes occupied by wolves, jackals and foxes in the stone desert. Details are given of their seasonal occurrence and abundance in or near these places, and the species associated with each are enumerated.

The conditions that render the burrows or holes of animals in the deserts suitable for the breeding of sandflies are discussed. The microclimate in them is characterised by a rather high humidity and moderate temperatures, and they afford shelter from the extremes of summer heat and winter cold and the strong drying winds that prevail outside. Moreover, they are frequently used as temporary shelters by various small mammals, reptiles or birds, on which the sandflies probably feed. Reptiles are abundant in the sand deserts, and notes are given on the species that occurred in the burrows of *Rhombomys* in association with *Phlebotomus* spp.

Sandflies were abundant in and near the burrows of *Rhombomys* and *Spermophilopsis* in the sand desert from the end of April till the middle of July and readily attacked man in the evening ; their frequency varied with the size of the rodent colonies. They occurred at fairly great distances from the burrows during the evening and night, and it was often observed that they left them in numbers in the evening, and returned in the early morning hours. Tortoises were numerous in the loess desert and were active for about three months from March, when the vegetation appears, until May, when it dries up. They then remain dormant in their burrows for nine months, after having blocked the entrances with a thick layer of soil. Sandflies were common from mid-April until early May but none was observed after the end of May until the following spring. There was thus apparently only one generation a year, with a long developmental period in the burrows. In the stone deserts in the mountains, sandflies occurred from April to the end of November in holes occupied by wolves, and were most abundant for about two months in early summer. They were also numerous in the holes of jackals and foxes. They flew out during the evening and night and readily attacked man.

FEVERS OF THE TYPHUS GROUP

American Association for the Advancement of Science. Section on Medical Sciences. **Rickettsial Diseases of Man.**

This book is reviewed on p. 590.

Freeman, G., Varela, G., Plotz, H. & Ortiz Mariotte, C. **Typhus Fever in Mexico : a Study of Epidemiology by means of Complement-Fixation.** *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 63–9, 2 figs.

This study was carried out in 1944–1945, and had the benefit of the collaboration of the late Colonel Harry Plotz. It is of special interest in connexion with the widely held belief that louse-borne typhus in Mexico often originates from murine rickettsiae which are capable of adapting themselves to transmission from man to man by lice.

Out of the 237 serum samples, collected from all over Mexico, in which positive reactions were obtained with complement-fixation tests at titres of 1–10 or over, the great majority (184) gave higher titres with epidemic antigen ; 48 had dominant murine antibodies, and the remaining 5, which were negative

for epidemic and murine antigens, reacted with Rocky Mountain spotted fever antigens. The predominant type was, therefore, the epidemic, but in some areas murine infection was dominant, and in others it occurred side by side with epidemic infection.

In two isolated epidemics in which it was suspected that infection had originated from a murine strain the reactions showed that the earliest cases were epidemic in type. These two "negative instances" are not regarded as conclusive in themselves and the cautious conclusion of the authors is that "any suspected immunological relationship between the murine and classical types is not self-evident from these observations."

In some proved cases of typhus the titres had fallen below 1–10 two to four years after infection. *John W. D. Megaw*

FREEMAN, G., CASTILLO SOLOGUREN, F. & ESPINOSA, H. **Typhus Fever in Peru : a Study of Epidemiology by means of Complement-Fixation.** *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 71–8, 4 figs.

This study was carried out on the same lines as the one described in the preceding abstract. Out of 374 serum specimens collected from all over Peru, and received in Washington in good condition, 192 gave positive complement-fixation reactions, and in every case this was of the epidemic type. The infected regions were exclusively the elevated *sierra* and *altiplano* areas of Central and Southern Peru ; the small number of positive specimens received from the coastal cities were from persons who had come from crowded villages in the *sierra*.

There was evidence that the titre of the reaction tended to fall after about six months and that negative reactions after that period did not necessarily exclude the diagnosis of typhus. *John W. D. Megaw*

WEYER, F. Die Kleiderlaus als therapeutisches Testobjekt. (Zugleich ein Beitrag zur Wirkung von Penicillin auf Rickettsien). [**The Body Louse as a Subject in Chemotherapeutic Tests.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, v. 128, Nos. 5/6, 499–505.

The louse was found very tolerant of intrarectal injections of various chemicals such as sulphonamide solutions, penicillin, etc.

The insects were first inoculated by Weigl's method with typhus rickettsiae and then with chemicals whose therapeutic value was to be tested.

Para-aminobenzoic acid was found completely inactive but penicillin, given at intervals of three, twenty-four, and forty-eight hours, after inoculation, was remarkably effective, causing complete inhibition of growth in seven out of nine batches, each consisting of 30 lice. The action of the drugs was judged by examining stained smears of the guts of the lice. Apart from one batch of lice treated with penicillin which had accidentally become inert the result was that out of 148 lice examined after treatment only one was found to harbour visible rickettsiae, whereas among untreated control lice 77 per cent. were positive.

The author admits that the louse serves practically as a test tube and that the results must be regarded as preliminary and tentative. He suggests, however, that the method may possibly be applicable to the testing of vaccines [presumably by introducing the vaccines into the rectum and later inoculating the insects with virulent cultures]. *John W. D. Megaw*

CARRERE, L. & MOUSTARDIER, G. Note sur l'agglutination du *Proteus OX19* par des sérums humains et en particulier par des sérums de femme enceinte. [**Note on Agglutination of *Proteus OX19* by Human Sera, in particular by Sera from Pregnant Women.**] *Ann. Biol. Clin.* 1948, Sept.–Dec., v. 6, Nos. 9/10, 524–6.

GRATCH [this *Bulletin*, 1944, v. 41, 197] found that a large proportion of sera from pregnant women agglutinated *Proteus OX19*, often to high titres. The present authors examined sera from various sources by a slide agglutination method, the results being classified as positive (agglutinating in less than two minutes), late or false positive (agglutinating in over two minutes) and negative. Of 57 sera from women who were pregnant or had recently been confined, 55 were positive and one was negative, the remaining serum giving a late positive result. Of 483 sera from men or non-pregnant women, 133 were positive, 202 were negative and 148 gave a late positive result. The positive sera from pregnant women were tested by a tube method. The mean titre was 1/40, and no titre higher than 1/80 was recorded. High titres, as reported by GRATCH, were thus not found in the present series. The authors suggest that the only practical application of their observations would be in the diagnosis of pregnancy, since a negative test is not likely to be found in a pregnant woman.

[See also NELSON and CRUICKSHANK, this *Bulletin*, 1945, v. 42, 363, and BARNES, *ibid.*, 1949, v. 46, 129.] *J. C. Cruickshank*

ZALMAN, M., DAVID, P. & HORTOPANU. Reactii biologice in "tifosul exantematic." [**Biological Reactions in Epidemic Typhus.**] *Rev. Ştiinţelor Med.* Bucharest. 1948, July–Aug., v. 37, Nos. 7/8, 382–96, 3 figs. French summary.

Because of the clinical analogy between uraemia and nervous forms of epidemic typhus, the authors studied certain biochemical reactions in the blood and urine of 180 in-patients in a hospital in Timişoara, Rumania.

Blood urea was increased in all nervous and cerebral forms and its level has an important prognostic significance: when it exceeds 1 gm. per thousand a fatal result may be expected.

Chlorides were found to be diminished in blood and urine alike in every case and this was particularly significant in the early stages.

Blood sugar was normal in the common forms, but it was variable in the graver cases.

Uric acid was always increased, usually from the end of the first week.

The *Takata-Ara reaction* was usually found positive, especially in the severe forms. The authors state that when the intensity of this reaction is parallel with that of the Weil-Felix, the prognosis is good: but when it is accompanied by a low titre of the Weil-Felix reaction, the prognosis is grave.

As a result of these observations, the authors recommend that repeated examinations of blood urea should be made in every case of epidemic typhus, and that when it is increased, treatment appropriate to uraemia should be instituted. They also recommend that in severe cases the patient should be "flooded" [*inonder*] with normal saline by every possible route so as to re-establish the normal chloride levels in the blood and urine. The *cerebro-spinal fluid* was also studied biochemically in 10 cases only. From these few studies, the authors suggest that the results may serve to distinguish between the true meningo-encephalitic and the other nervous form of the disease: in the former case, it shows meningeal or encephalitic features and in the latter, a luetic picture. *H. J. O'D. Burke-Gaffney*

ZAHARIA, N. I. & BERNFELD, M. Viteza de sedimentare a hematiilor in cursul tifusului exantematic. [**The Erythrocyte Sedimentation Rate in Epidemic Typhus.**] *Rev. Ştiintelor Med.* Bucharest. 1948, Sept.–Oct., v. 37, Nos. 9/10, 463–74. French summary.

The following is a translation of the authors' summary :—

During the first week of the disease, the sedimentation rate is somewhat variable : in most cases, the values vary between 0 and 20 mm. after 1 hour. Towards the end of the period, the sedimentation rate increases to 30 or 40 mm. after the first hour. During convalescence, it is maintained at this level. There is no correlation between the gravity of the illness and the height of the sedimentation rate. When there are suppurative complications, the rate is appreciably increased. The estimation of the sedimentation rate is of relative value in prognosis, but it may be useful for making a differential diagnosis in certain cases. [See also this *Bulletin*, 1949, v. 46, 45.] *H. J. O'D. Burke-Gaffney*

SCHOENBACH, E. B. **Aureomycin Therapy of Recrudescent Epidemic Typhus (Brill's Disease).** *J. Amer. Med. Ass.* 1949, Feb. 12, v. 139, No. 7, 450–52, 1 chart.

" A 42 year old Rumanian born man, ill with recrudescent epidemic typhus (Brill's disease), was treated on the sixth day of disease with aureomycin by oral and intramuscular routes. Prompt clinical improvement was observed. This is the first case of Brill's disease with a serologic pattern consistent with recrudescent epidemic typhus to be reported in Baltimore."

GIROUD, P. & CIACCIO, G. Valeur antigène et pathogène des précipitats de poumon de lapin infecté de rickettsies épidémiques et murines par l'alcool méthylique. [**The Antigenic and Pathogenic Potency of Precipitates, obtained by treating with Methyl Alcohol, of Lung Suspensions of Rabbits infected with Typhus Rickettsiae.**] *C. R. Soc. Biol.* 1948, Oct., v. 142, Nos. 19/20, 1222–3.

Suspensions of rabbit lungs infected with rickettsiae were treated with varying strengths of methyl alcohol and kept for two to seven hours at varying temperatures ; the precipitates were separated by centrifugation and then tested by intradermal inoculation of rabbits. The resulting dermal reactions were regarded as showing the degree of virulence of the precipitates, and it was found that when the alcoholic strength was 30–40 per cent. the reactions were feeble, although the production of agglutinins in the inoculated animals was almost as great as when untreated suspensions were injected.

This result suggested to the authors that alcohol treatment might be a suitable means of obtaining attenuated living vaccines.

John W. D. Megaw

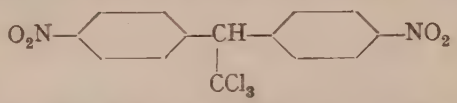
SERGENT, Ed., PARROT, L. & HORRENBERGER, R. De la prévention des épidémies de typhus exanthématique par des vaccinations collectives en région d'endémicité pendant les périodes interépidémiques. [**Prevention of Typhus Epidemics by Mass Inoculation in Endemic Regions in the Inter-Epidemic Periods.**] *Bull. Acad. Nat. Méd.* 1949, v. 133, Nos. 3/4, 62–3.

Epidemic typhus in Algeria is commonly cyclical, occurring in severe " waves " of 3 or 4 years' duration, followed by a subsidence for 8 to 12 years. The authors discuss the epidemiology of this cycle and the need, between the epidemics, to support the resistance of communities in foci liable to become re-attacked.

The non-living vaccine of Durand and Giroud is very effective, but its protection is short-lived : in the face of an epidemic, re-inoculation is desirable every six months. The authors describe a plan for yearly mass inoculation in known epidemic foci of typhus, during the post-epidemic period. The vaccine does not give severe reactions, but there is the practical difficulty of giving three weekly doses of 1 cc. each to people as scattered as rural Algerians. For this purpose, the vaccine has been replaced by one which contains in a single dose of 2 cc. the same number of organisms as there are in the 3 cc. of the three spaced doses of 1 cc. each. The stronger dose seems to be without ill-effect, and thousands of people in these affected areas have in fact already received it : no serious results have been reported. The authors add that, where possible, the course of three spaced weekly doses of 1 cc. each should be adhered to in the case of unusually susceptible persons, such as non-immune Algerians, new arrivals from Europe and young children. *H. J. O'D. Burke-Gaffney*

BOCK, Marianne & KIKUTH, W. Zur Frage der chemotherapeutischen Beeinflussung des Fleckfiebers. [**Chemotherapeutic Action on Typhus.**] *Klin. Woch.* 1948, Nov. 15, v. 26, Nos. 43/44, 691–4, 2 figs.

2,2,2-trichlor-1,1,-di-(4′-nitrophenyl)-ethane, provisionally known as Pb 852, is a new compound with an action on murine typhus. Its structural formula is :—



It is insoluble in water but can be suspended in oil or in a commercial preparation " Solvent ' M '." Toxicity is low ; an oily suspension of 20 mgm. is well tolerated by a mouse of 20 gm. body weight both by the subcutaneous and oral routes. Subcutaneously a dose of 40 mgm. per 20 gm. body weight kills, but a dose of 30 mgm. is not fatal. By mouth a dose of 70 mgm. per 20 gm. body weight kills, but 40 mgm. are well tolerated. An oral dose of 2·5 mgm. of the oily suspension daily for five days gives a good therapeutic result in mice infected with murine typhus. A daily dose of 2·5 or 5 mgm. for 6 days of the drug in solvent M is curative both subcutaneously and orally. If the rickettsiae are inoculated intranasally the therapeutic action is much less in evidence. The action of Pb 852 is apparently specific for rickettsiae, for the compound has no action on the viruses of influenza, lymphocytic choriomeningitis, louping ill, and bronchopneumonia of mice, or on spirochaetes, spirilla, the bacilli of rat leprosy, trypanosomes or malaria parasites. *G. M. Findlay*

CROSS, H. F. ; SNYDER, F. M. **Field Tests of Uniforms impregnated with Mite Toxicants : I. Protection Studies** [CROSS & SNYDER]. *J. Econom. Entom.* 1948, Dec., v. 41, No. 6, 936–40. **Part II. Stopping-Time Studies** [SNYDER & CROSS]. *Ibid.* 940–41.

During the second World War, benzyl benzoate was used for impregnating uniforms for protection against mites responsible for scrub typhus infections. In the course of a search for chemicals more resistant to washing than benzyl benzoate, 6,000 materials were subjected to screening tests, and finally eighteen of them were compared with benzyl benzoate. Of these, five were selected which did not stain, cause skin irritation or have an undesirable odour. These were :—benzil ; benzoic acid, phenyl ester ; benzoic acid, 2 thenyl ester ; diphenyl carbonate ; and salicylic acid, 2 thenyl ester.

Tests were carried out to determine—

(i) The protection given to wearers of uniforms impregnated with test materials at 2 mgm./sq. ft. of cloth. The evaluation of protection was based on the number of mites attached to subjects wearing these uniforms in heavily infested areas over 1–2 hours. The mites were counted 3–5 hours after exposure and tests were made after the second, third, sixth and other washings of the garments.

Phenyl benzoate, diphenyl carbonate and 2 thenyl salicylate gave 100 per cent. protection through seven washings; 2 thenyl benzoate through six washings. Benzyl benzoate gave 99 per cent. protection after the third washing, and none after the fourth. With benzil, protection decreased from 99 to 83 per cent. after eleven washings.

(ii) The time required to immobilize mites confined to impregnated cloth.

There was found to be a correlation between the time taken for the immobilization of mites and the protection achieved. Substances giving a protection of over 90 per cent. caused immobilization of mites in fifteen minutes or less. The intervals between the time the mites first become affected and are finally immobilized increases with the number of washings; this applied to all materials. *C. M. Harrison*

PARKER, R. R., BELL, E. J. & STOENNER, H. G. **Q Fever—a Brief Survey of the Problem.** *J. Amer. Vet. Med. Ass.* 1949, Feb. & Mar., v. 114, Nos. 863 & 864, 55–60; 124–30. [61 refs.]

NAUCK, E. G. & WEYER, F. Der Erreger der "epidemischen Bronchopneumonie des Menschen" (Herzberg) und seine Beziehung zur *Rickettsia burneti* (Q fever). [**The Organism of "Human Epidemic Bronchopneumonia" (Herzberg) and its Relationship to** *Rickettsia burneti* **(Q Fever).**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, v. 128, Nos. 5/6, 529–50, 8 figs. [30 refs.]

The ostensible purpose of this paper is to show that a strain of infection described by HERZBERG in 1946 as the filterable virus of human bronchopneumonia is really the rickettsia of Q fever. The strain, in fact, appears to be the one isolated by Caminopetros in Greece in 1943 and later identified in the U.S.A. as *Rickettsia burneti* by the Commission on Acute Respiratory Diseases [see this *Bulletin*, 1947, v. 44, 68].

The authors were severely handicapped in their study of the strain by the fact that no standard strain of *R. burneti* was available for the crucial tests of cross immunity and complement fixation reactions, but the detailed description of the morphology of the rickettsia and of its behaviour in experimental mice, guineapigs and various arthropods leaves little room for doubts regarding its identity with *R. burneti*.

A specially interesting feature of the investigation was the intrarectal inoculation of lice and fleas by virulent suspensions; in body-lice rickettsiae were still present in the faeces 24 days after inoculation, but only in small numbers. In the mouse-flea, *Leptopsylla segnis*, growth occurred much more actively. Intracoelomic inoculation of ticks, especially *Ornithodorus moubata*, was very successful; infection persisted up to 282 days and the coxal fluid of the ticks was infective to mice up to 67 days after inoculation. These findings suggested that the tick is likely to be an effective natural vector. The organisms multiplied readily in the fat bodies of the grain weevil, *Tenebrio molitor*. The ease with which development occurred in different arthropods corresponded to similar findings in connexion with *R. prowazeki*, *R. mooseri*, and *R. orientalis*,

and did not suggest that natural transmission was likely to occur by all the arthropods concerned, though it did suggest a close relationship with the rickettsiae of the fevers of the typhus group.

The morphological features of the rickettsiae are fully described and are illustrated by excellent photomicrographs. In average size they appeared to be rather smaller than the rickettsiae of the fevers of the typhus group, but otherwise they were similar in all essential respects. The peritoneal cells of inoculated mice were not found to be invaded; the chief concentration of the organisms was in the spleen. No special tendency to invasion of the lung cells was observed even after intranasal inoculation.

The proposal of PHILIP to create a new subgenus, *Coxiella*, is regarded as premature and agreement is expressed with the present reviewer's comment on Philip's proposal [see this *Bulletin*, 1943, v. 40, 828]. A protest is made against the use of such names as "atypical," "primary atypical," "benign," and "epidemic" pneumonia; these names are regarded as meaningless and although pneumonic lesions are common they are far from being essential features of the disease.

Full justice cannot be done to the paper in an abstract; if, as seems likely, the rickettsia turns out to be *R. burneti*, the study will take its place as an important contribution to knowledge of that organism.

John W. D. Megaw

YELLOW FEVER

GARNHAM, P. C. C. **Acrodendrophilic Mosquitos of the Langata Forest, Kenya.** *Bull. Entom. Res.* 1949, Mar., v. 39, Pt. 4, 489–90.

After a human case of yellow fever had been traced to Langata Forest, near Nairobi, Kenya in 1943 it was shown that a mild focus of yellow fever existed there, probably the highest in Africa (6,000 feet). Observations on forest mosquitoes were begun and later extended to include those in the tree tops.

The numbers are given of the females of eight species of *Aëdes* caught on an African child on a platform built in a tree 30 feet from the ground. Catches were made from 7 to 10 a.m. and from 5 to 8 p.m. six times a week from May, 1946, to March, 1947. *Aëdes deboeri* were the most numerous, with 28 caught in the mornings and 154 in the evenings. One *Aëdes aegypti* was caught. Other platform catches yielded similar results. Simultaneous catches at ground level revealed a wide range of mosquitoes, but only nine specimens of *Aëdes deboeri* were captured.

Attention is drawn to the following points; the presence of *Aëdes aegypti*; the relative abundance of *Aëdes deboeri* in the forest but not at ground level; the absence of *Aëdes africanus*, a known vector, and of *Aëdes adersi* a suspected vector. The investigation was admittedly on a small scale and in the circumstances it is not possible to say more than that *Aëdes deboeri* may be the jungle vector of yellow fever in Langata.

H. S. Leeson

DICK, G. W. A. & SMITHBURN, K. C. **Immunity to Yellow Fever Six Years after Vaccination.** *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 57–61.

Recently ANDERSON and GAST-GALVIS [see this *Bulletin*, 1947, v. 44, 813] reported that neutralizing antibodies were present in the sera of 93 per cent. of a group of 623 people in Colombia who had been injected with a vaccine made from the 17D strain of yellow fever virus at least five years previously.

The present authors have made a similar observation in Uganda in Central Africa. They found that 91·8, 86·5, 82·8 and 87·4 per cent. of four groups injected with the 17D strain of yellow fever virus vaccine still had demonstrable neutralizing antibodies in their serum six years later. Tests of sera from groups of children aged six years or less in each region gave no indication that the yellow fever virus had been present in these areas since the vaccine had been injected. [It is probable that the remaining 17·2–9·2 per cent. also have some residual immunity but at a level below the sensitivity of the mouse neutralization test.] These results confirm the validity of the certificate of yellow fever immunity for four years, provided that the required dose of active virus has been injected in the vaccine. The results also agree with those of Anderson and Gast-Galvis in showing no significant difference in the immune response of adults and children. [See also this *Bulletin*, 1943, v. 40, 451; 1946, v. 43, 34.] *F. O. MacCallum*

RABIES

PICKAR, D. N. & KRAMER, H. M. **Encephalitis complicating Vaccination for Rabies. Report of a Case treated with Antihistamine Agents.** *Southern Med. J.* 1949, Feb., v. 42, No. 2, 127–30.

In the article under review the authors describe the hitherto untried treatment with antihistamine agents of a case of that very infrequent reaction to antirabies vaccination, encephalomyelitis without paralysis.

The patient, a 26-year-old white man, without history of personal or familial allergic disorders, was admitted to hospital 20 days after having been bitten by a rabid cat. Daily injections of Semple's phenol-killed vaccine were begun some days after the date of biting and were continued over a 10-day period. After the seventh injection the patient noticed swellings at the sites of inoculation; after the tenth injection he became feverish, and suffered progressively increasing frontal headache, somnolence, nausea, vomiting, muscular soreness and diplopia. Thereafter vaccine treatment was discontinued and the patient remained at home in bed for some days, until his condition became so alarming as to necessitate his removal to hospital. On admission he was mentally confused and disorientated, with a temperature of 102°F.; there was marked nuchal rigidity, but the Kernig and Brudzinski signs were negative. Neurological examination was otherwise normal. The report of the electro-encephalogram read: . . . . "The impression is of a moderately and diffusely slow electro-encephalogram compatible with diffuse encephalopathy." The cell count showed in the cerebrospinal fluid 240 cells per cmm.: 89 per cent. lymphocytes, 11 per cent. polymorphonuclears.

Hospital treatment consisted first in the administration of 500 cc. of pooled plasma to ward off the impending circulatory collapse. Antihistamine agents were then exhibited, because of the possibility that the condition might be allergic: 100 mgm. of benadryl were given intravenously in 1000 cc. of 5 per cent. glucose in saline, and 100 mgm. were administered by the mouth 4 hours later. Prompt improvement in all symptoms followed, with gradual fall in the temperature to normal within 16 hours. Benadryl was continued in doses of 100 mgm. orally 3 times a day until the patient's increasing somnolence compelled its discontinuance after the ninth dose. During the succeeding 24 hours, no antihistamine drug was exhibited and there resulted a temperature rise to 99·6°F., accompanied by return of severe frontal headache and diplopia. Reinstitution of antihistamine treatment with pyribenzamine in doses of 100 mgm. 3 times daily caused almost immediate cessation of headache and

return of the temperature to normal. Such pyribenzamine treatment, continued for the next 7 days, succeeded in rendering the patient wholly asymptomatic, although the cerebrospinal fluid contained 115 cells per cmm., 99 per cent. of which were lymphocytes. At this time there was marked improvement in the appearance of the electro-encephalogram and 16 days after admission the patient was discharged from hospital afebrile, asymptomatic and completely able to walk.

In connexion with this case it is of interest and importance to note that, although without personal or familial history of allergic disorders, the patient, after intradermal injection of 0·1 cc. of a 1 in 100 dilution of the same material used for his antirabies vaccination, developed on the forearm a wheal 1·5 cm. in diameter surrounded by a flare of 6 cm.; and that, on repetition of the test after 48 hours of pyribenzamine administration in the same dosage as had been used therapeutically, no skin reaction resulted.

Evidence is thereby adduced in favour of the view first advanced by McKendrick at the International Rabies Conference held in Paris in 1927 that anaphylaxis may play a rôle in the causation of the neuro-paralytic accidents of antirabies treatment—a view strongly supported by Horack [this *Bulletin*, 1939, v. 36, 730] and by Thomas [*ibid*, 1945, v. 42, 168].

The authors recommend that, inasmuch as recovery followed the use of antihistamine agents in the present case, further clinical trial of these drugs should be made in the treatment of the neuroparalytic accidents of anti-rabies vaccination.

G. Stuart

Verge, M. J. Meurt-on encore de rage? [**Does one still die of Rabies?**] *Rev. Path. Compar.* 1948, Dec., No. 602, 583–5.

The author introduces the subject of his enquiry by stating that deaths from human rabies totalled 151 in the hospitals of Shanghai during the period 1933–46, and 3,000 in the U.S.A. between the years 1903 and 1947. Moreover certain recently published reports challenge the value of anti-rabies treatment and imply that vaccination in man may not be as effective as originally believed. In his defence of Pasteurian treatment, however, the author refers to the statistical evidence of Babes and Lepine, *viz.*, that mortality among persons bitten by rabid dogs is from 9·3 to 70 per cent. in the untreated, as compared with from 1 to 2 per mille in the treated, and stresses the need, in evaluating the results of anti-rabies treatment, for differentiation between "apparent" and "real" failures of vaccine therapy. Germane to the latter observation are the statistical results quoted from Remlinger and Bailly in respect of the several Anti-Rabies Services in French North Africa. Of 77,453 bitten persons treated, 262 died of rabies—142 being regarded as apparent failures, 120 as real failures of treatment. Real failures occurred most frequently among adults and, paradoxically enough, were consequent less on serious wounding than on slight exposures inadequately treated. Apparent failures obtained mostly among children or among persons bitten by wild animals such as wolves and jackals; to these failures the exalted virulence of certain street viruses also contributed. The conclusion is reached that anti-rabies vaccination remains the sole effective means of combating the invasion of the human body by rabies virus. [The author defines failures of anti-rabies treatment as follows: "apparent": onset of rabies during treatment; "real": onset during the weeks or months after treatment. In this connexion it is of interest to recall one of Otten's criteria for the drawing up of all rabies statistics on uniform basic principles: Individuals treated, as well as deaths, should be classified according to age, in view of the fact that experience has generally shown that the mortality is higher among children than it is among adults. Moreover the

method frequently employed, which consists in the suppression of any mention of the total mortality and indicates only the number of failures of treatment or cases in which symptoms developed 15 or more days after the end of treatment, may give a very erroneous impression of the results obtained, because the longer the duration of treatment the greater will be the number of cases of hydrophobia excluded from the "failures." It is therefore logical to use the date of the beginning and not that of the end of treatment from which to reckon the period on the lapse of which the appearance of symptoms implies a failure of treatment, the duration of treatment varying in different institutes. This period might, for example, be fixed at 30 days, in accordance with the old custom of applying Pasteur treatment for 16 days, to which 14 days are added to make allowance for the intracerebral incubation period.] *G. Stuart*

PLAGUE

i. Karamchandani, P. V. & Rao, K. S. **Streptomycin in Human Plague compared with other Treatments.** *Lancet.* 1949, Jan. 15, 96–7, 2 figs.

ii. Hill, A. B.; Bhagwat, S. Y. **Streptomycin in Human Plague.** [Correspondence.] *Ibid.* Jan. 29, 203.

i. A group of 15 plague patients, specially selected as being apparently moribund, were treated by streptomycin: Only three of them died, and these had been admitted after the 3rd day of the fever in a condition "indicating impending dissolution."

In another group of 32 patients, treatment was by sulphadiazine, combined in some cases with anti-plague serum; there were seven deaths so that there would have been no significant difference between the results of the two methods of treatment but for the fact that three of the patients who had become "apparently moribund" while under treatment by sulphadiazine, were saved by streptomycin, which the authors regard as superior to any other treatment.

The dosage adopted was 0·5 gm. every six hours, up to a minimum total of 1·0 to 2·0 gm. and a maximum of 8·0 gm.

ii. In a letter to the *Lancet*, Professor Bradford Hill criticizes the authors' presentation of the case for streptomycin and describes it as consisting of pseudo-statistical "evidence" which is calculated to damage rather than further the reputation of the drug. In the same letter an attack is made on the validity of the statistics presented by the authors regarding fatality rates among inoculated and uninoculated patients. The authors state that among 120 inoculated patients the mortality rate was 27·5 per cent. and among 80 uninoculated, 32·5 per cent. The authors further state that the mortality rate was "composed of 18 per cent. among those who had been inoculated 1–7 days, 4·5 per cent. among those inoculated 7–14 days, and 9 per cent among those inoculated 14 days to 4 months before the onset of plague." The latter set of figures does not, as might be supposed, deal with the mortality rates for each of the three sub-groups but appears to have been obtained by dividing the deaths in each sub-group by the total 120 cases, irrespective of the date of inoculation, so that "the resulting figures have no meaning whatever."

In the same number of the *Lancet* Dr. S. Y. Bhagwat also makes a trenchant criticism of the figures dealing with the mortality rates among inoculated and uninoculated patients. He points out that if, as stated, immunity develops a week or so after inoculation the patients dying in the first week may rightly be

regarded as uninoculated and the figures will become 11·2 per cent. mortality among 98 inoculated, against 46·3 per cent. among 108 uninoculated.

This is only one out of five points of criticism offered by Dr. Bhagwat.

John W. D. Megaw

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

WESTPHAL, A. Zur Epidemiologie und Pathogenese der Amöbenruhr in Nordafrika 1941–42. [**The Epidemiology and Pathogenesis of Amoebic Dysentery in North Africa 1941–42.**] *Ztschr. f. Hyg. u. Infektionskr.* 1948, July 16, v. 128, Nos. 1/2, 73–86, 4 figs.

These important observations were made in North Africa in soldiers of the Africa Corps in 1941–1942. The object was to determine the association between *Entamoeba histolytica* infection and the varied and numerous other intestinal affections encountered in North Africa. An experience in common with other campaigns in this area is that affections of the gastro-intestinal tract vastly outnumbered all other disabilities.

The study is richly illustrated with graphs, diagrams and statistical data which are difficult to summarize and sometimes are more difficult to interpret.

Amongst 1,069 men who were investigated during an average period of 10·4 months in N. Africa up to the autumn of 1942, 64 per cent. had experienced one or more intestinal upsets which persisted for longer than three days and comprised every gradation from simple diarrhoea to severe dysentery. There was no apparent correlation between the *E. histolytica* infection and the "intestinal upset-index." Even in any particular diagnosed intestinal bacillary infection the individual *E. histolytica* cyst-passers did not suffer more than those who were free from the protozoan. This observation indicated that *E. histolytica* could not be held responsible for the primary disturbance and this was confirmed by experiments made with stool filtrates obtained from *E. histolytica*-negative patients. On these premises it is suspected that in many intestinal disturbances there is a primary bacillary infection rather than a purely functional upset. In no less than 4,057 patients with clinical dysentery, on the basis of the clinical picture and the microscopic faecal examination, 96·3 per cent. could be diagnosed as primary bacillary and only 3·7 per cent. as amoebic dysentery. But in fact out of the large number (96·3 per cent.) of bacillary infections 7·6 per cent. were found to have a superinfection with lumen-inhabiting forms of *E. histolytica* and 1·4 per cent. could be considered to be suffering from a mixed infection of both bacillary and amoebic dysentery. The total infection-index for *E. histolytica* in these 4,057 dysenteries was no higher than the figures obtained from 961 investigated normal persons. This experience would entirely negative the supposition that this amoeba was responsible for the numerous bowel infections encountered, but rather, so the author assures us, his figures would support the conclusions deduced from his former self-inflicted experiments in 1937 and 1938 [this *Bulletin*, 1938, v. 35, 586; 1939, v. 36, 288].

From the protocols of several specially minutely investigated cases support has been obtained that a lumen infection with *E. histolytica* ensues upon bacillary spoiling of the mucosa. Calculations based upon statistical analysis prove that in about one-third of all *E. histolytica* cyst-passers, who subsequently contract some bacillary infection of the gastro-intestinal tract, the lumen infection develops into the classical *E. histolytica* tissue-invading phase.

P. Manson-Bahr

VAN STEENIS, P. B. Enkele opmerkingen over amoebendysenterie en amoebiasis. [**Observations on Amoebic Dysentery and Amoebiasis.**] *Nederl. Tijdschr. v. Geneesk.* 1949, Jan. 1, v. 93 (i), No. 1, 11–18. English summary (5 lines).

The author reviews our present knowledge of the pathogenesis, clinical course and diagnosis of amoebiasis. The discussion is on familiar lines, except for the interpretation of the life history of *Entamoeba histolytica*, in which the author follows KUENEN and SWELLENGREBEL [see this *Bulletin*, 1914, v. 3, 76]. According to this view, in symptomless carriers and in chronic cases of amoebiasis the amoeba lives in the lumen of the gut as a commensal (the so-called *minuta* form) and is responsible for the maintenance of the infection in the same host and for its propagation to others by formation of cysts. Under certain conditions, the nature of which has not yet been clearly established, the amoebae may invade the intestinal wall, producing characteristic lesions and clinical symptoms. The tissue-invading amoebae feed on red blood corpuscles and are larger than the lumen-forms, which show some resemblance to *E. coli*. Indirect evidence of the existence of a lumen-dwelling phase of *E. histolytica* is provided by the enormous numbers of cysts passed by carriers and chronic sufferers, which are out of all proportion to the small number of tissue-inhabiting amoebae that may be present in lesions, which, according to FAUST [this *Bulletin*, 1941, v. 38, 590], are found in all such cases. The present paper is an example of a growing tendency to reconsider our views on the host-parasite relations in amoebiasis, in the light of recent observations on the behaviour of *E. histolytica* in cultures and in infections (natural and experimental) of lower mammals [*ibid.*, 1948, v. 45, 76]. *C. A. Hoare*

RITCHIE, L. S. & DAVIS, C. **Parasitological Findings and Epidemiological Aspects of Epidemic Amebiasis occurring in Occupants of the Mantetsu Apartment Building, Tokyo, Japan.** *Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 803–16, 1 fig. [11 refs.]

This paper reports epidemiological observations and parasitic findings in the Mantetsu apartment building in Tokyo, in January 1947.

The Tokyo water supply had been declared potable. At the time the epidemic was exposed, 73 families of American officials were housed in this building, and a total of 161 persons has been taken into consideration. The arrival dates ranged from 15th November 1946 to 25th January 1947. The rates of protozoan infections in this group prior to their residency in Mantetsu can be little more than speculation and there was no reason to believe that they entered the building with the strikingly high rates they were later proved to have. Although some of the men had spent considerable time overseas, this was not true for the women.

Of the employees, 248 Japanese employed at the building were subjected to multiple stool examinations and were divided into two categories—food handlers and non-food handlers, and on the basis of the control of 15,000 stool examinations on other Japanese Nationals the pre-epidemic protozoan infection rates for the Mantetsu group were estimated to be: *E. histolytica* 7–10 per cent., *E. coli* 15–18 per cent., *Endolimax nana* 10–15 per cent., *Giardia intestinalis* 5–8 per cent. and *Chilomastix mesnili*, 1–2 per cent.

Numerous cases of diarrhoea were noted early in January 1947, but the symptoms were so moderate as hardly to attract attention. Out of sixteen stools, half were positive for *E. histolytica* (stage not stated). These findings were considered sufficient to warrant the investigation of the water system and dining facilities. The procedure adopted was divided into several phases:

Initial examination.—The general policy was to examine two or more stools before treatment.

Second phase.—If *E. histolytica* had not been diagnosed after 3–5 examinations, the person concerned was examined again twice at weekly intervals and then twice at bi-weekly intervals before being declared free of *E. histolytica*.

Post-treatment examinations were made immediately after treatment and subsequently at intervals of 2, 4, 8 and 12 weeks.

Terminal examinations.—Two stools of each occupant were examined at the end of six months. Most diagnoses were made on cysts. When only trophozoites were present the diagnosis was tentative unless typical motility was observed. Saline and iodine direct smears and a microscopic preparation from an ether-sedimentation concentration technique were searched in each specimen submitted.

Adults at the Mantetsu numbered 151 and of these *E. histolytica* was found in 62·9 per cent., while the probable incidence prior to residence in the Mantetsu was estimated to have been 5 to 10 per cent.

One or more protozoa were harboured by 75·4 per cent. of the Japanese and the incidence of *E. histolytica* was 22·2 per cent., while *G. intestinalis* was the most commonly encountered protozoan in both Japanese and Americans.

As in the case of the Chicago hotel epidemic of 1933 [see *Bulletin of Hygiene*, 1934, v. 9, 178, 315], no significant difference existed in the susceptibility of the sexes for any of the intestinal protozoa. Among the Japanese the percentage of incidence was approximately the same in those who handled food and in those who did not.

Investigation of the sewage system in the sub-basement revealed a considerable leakage and probable contamination of the water supply. The massive nature of the protozoan infections rendered it unlikely that any agency other than water could have infected so many persons in such a short period of time.

[The large percentage of *E. histolytica* cysts in the faeces combined with apparent absence of acute cases with blood and mucus in the stools would seem to militate against a proven epidemic of amoebiasis.] *P. Manson-Bahr*

DAVIS, C. & RITCHIE, L. S. **Clinical Manifestations and Treatment of Epidemic Amebiasis occurring in Occupants of the Mantetsu Apartment Building, Tokyo, Japan.** *Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 817–23.

The clinical manifestations and treatment of one hundred cases of amoebiasis occurring among American occupants of the Mantetsu apartment building [above] are described.

The relative mildness of the clinical manifestations is ascribed to the brief period of exposure to infection with *E. histolytica*. Fully 25 per cent. gave no history of gastro-intestinal complaints since arriving in Japan. Diarrhoea was the most commonly reported finding and approximately 40 per cent. of patients noted one or more episodes of 2–4 days duration of only 2·3 loose stools per day. Approximately 28 per cent. averaged 4–8 stools per 24 hours and only 7 per cent. averaged 8–15 stools during the same period. A few rice-water stools were submitted. *No macroscopic or microscopic blood* was recognized in any of the stools. Practically all patients noted vague "bloating" epigastric discomfort and varying degrees of lower abdominal discomfort after meals and approximately 10 per cent. reported nausea and vomiting. There were no fatalities.

Seventy-six of the patients were treated with carbarsone 0·25 gm. three times daily for 7 days, followed by diodoquin, 0·63 gm. three times daily for 7 days. The remainder were given emetine hydrochloride, 0·03 gm. intramuscularly

twice daily for 7 days concurrently with carbarsone and diodoquin as above: they were those with more severe diarrhoea.

Of the total number treated, three continued to pass cysts of *E. histolytica* after one course of treatment, two of these had negative stools after a second course, while one child required four courses before the stools were found to be negative. Seventeen patients continued to have occasional episodes of mild diarrhoea or abdominal cramps in spite of repeated post-treatment negative stools.

[The absence of blood and mucus from the faeces even in the more acute cases strengthens the view already expressed above.] *P. Manson-Bahr*

SENECA, H., HENDERSON, E. & HARVEY, Martha. **The Synergistic Action of Penicillin and Streptomycin on *Endameba histolytica* Cultures.** *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 37–9.

"Neither penicillin nor streptomycin is amebicidal in concentrations of 100 to 1,000 units per cc. A combination of the two, however, in equal unitage, kills amebae in the first generation at a total concentration of 2,000 units per cc., and in the second generation at 1,000 units per cc. The latter concentration is found not to be bactericidal, hence the action is probably a direct one rather than an elimination of necessary bacterial products. Therapeutic application of the findings is suggested."

SENECA, H., HENDERSON, E. & HARVEY, Martha. **Effect of Hyaluronidase and of Hyaluronic Acid on Cultures of Trypanosomes, Leishmania, and Amoebae.** *Science.* 1948, Dec. 24, 714–15.

Hyaluronic acid is a complex polysaccharide which with its enzyme, hyaluronidase, is found in bacteria and animal species. The effect of these substances was tested on cultures of *Leishmania donovani*, *Trypanosoma cruzi*, and *Entamoeba histolytica*. The flagellates were unaffected both by direct treatment and after numerous subcultures in media containing these substances. In the presence of the enzyme, *E. histolytica* became hyperactive with enhancement of growth; the acid, however, had a contrary effect, a dosage of 5 mgm. per 5 cc. sterilizing cultures after three generations.

It is suggested that hyaluronic acid might be usefully employed in the treatment of cases of amoebic dysentery (*a*) for its direct action on the organism, and (*b*) to inhibit the stimulatory effect of hyaluronidase. *P. C. C. Garnham*

COUTELEN, F., BIGUET, J. & COCHET, G. Hématophagie expérimentale de *Trichomonas natricis*. Le pouvoir hématophage constitue-t-il un test de pathogénicité chez les trichomonades parasites intestinaux. [**Experimental Haematophagy in *Trichomonas natricis* and its Possible Significance as a Test for Pathogenicity in Parasitic Intestinal Parasites.**] *Bull. Soc. Path. Exot.* 1948, v. 41, Nos. 11/12, 657–60. [13 refs.]

YAWS

HARDING, R. D. **A Yaws Campaign in Sierra Leone.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, Jan., v. 42, No. 4, 347–66, 1 map. [12 refs.]

This campaign was carried out among a primitive peasant population of 276,000 in eastern Sierra Leone. Practically the whole population was examined and all active yaws cases were treated. The vegetation of the area is discussed.

It is about 400 feet above sea level and swamps are numerous. The rainfall is 90–95 inches and is heaviest in June to October, when humidity is high.

The prevalence of yaws is undoubtedly correlated with social status and with hygiene. Secondary yaws lesions were most frequent during the wet season and least in the dry season. This must be taken into account in assessing the significance of changes in the incidence found at surveys after treatment at different seasons. Monthly examinations for one year of a population of 1,400, in a place where insufficient treatment was given to affect the general picture, showed that infectious lesions might be four times, and non-infectious lesions over twice, as frequent in the wet as in the dry season. About two-thirds of the whole population aged 10 years or over had been infected. At any one time, up to 13 per cent. of infectious yaws lesions were found in some communities examined in the wet season. Non-infectious yaws included dry secondary lesions, palmar and plantar keratosis, bone and all tertiary lesions. The author comments that late secondary non-infectious plantar lesions appeared to be much more frequent than in most parts of the world and in some areas comprised 80–90 per cent. of all yaws lesions. These lesions are aggravated by trauma and peasant occupations. [Plantar and palmar lesions urgently need thorough study. Their economic significance is rarely appreciated. The high incidence of these lesions in people aged 20–39 years, compared with that of the remainder of the population, suggests that many may be tertiary lesions.]

A valuable table of the incidence of various yaws lesions in different age groups in a community of 4,500 shows that primary and secondary framboesiomata occurred chiefly in those under 10 years of age, granulomatous plantar yaws were present equally frequently in the age groups 5–9 and 10–19, while non-infectious lesions were more frequent in those aged 20–39. This suggests a natural evolution of yaws. After 40 years of age yaws lesions gradually disappeared. This incidence is important in control in that attention should be concentrated on the younger sections of a community.

There was no evidence that any insects assist in transmission. Probably the most important factors in the spread of yaws are the crowding of naked children in hot, humid, dirty mud huts and the absence of personal cleanliness. In Sierra Leone yaws is a house disease spread by direct contact.

The author discusses the organization of the campaign and stresses the long quiescent periods in the secondary stage which may end the infectious relapses. The essentials in order of time are : (1) mass diagnosis and treatment ; (2) provision of permanent treatment centres placed so that no patient need travel more than 10–12 miles ; and (3) the establishment of itinerant yaws attendants who seek patients and send them to the nearest treatment centres. Treatment was given at intervals of 5 days to fit in with a campaign against trypanosomiasis.

The drugs at first used were acetylarsan (diethylamine acetarsol " D.A.") and bismuth sodium potassium tartrate, both given by intramuscular injection. At an early stage acetylarsan, 5 cc. (1·18 gramme D.A.) was found too toxic and the dose was finally reduced to 2·5 cc. (0·59 gramme D.A.) for 4 injections. The B.S.P.T., 5 grains (0·33 gramme) was found relatively ineffective and was finally replaced by bismuth salicylate 0·25 gramme in oil. The doses quoted are for body weight of 125 lb. (57 kilo.) or more. Four to six injections of acetylarsan and B.S.P.T. (or acetylarsan and bismuth salicylate) were given concurrently. It was later learned that the B.S.P.T. (Dr. Alexander's formula) contained only 4·34 per cent. bismuth metal while the bismuth salicylate B.P., contained about 58 per cent.

The clinical and serological results which have already been published by Apted *et al.* [this *Bulletin*, 1948, v. 45, 1089] showed that of infectious lesions

one year after treatment 64 per cent. were free of lesions, 32 per cent. had inactive plantar lesions and 4 per cent. had active yaws. For non-infectious lesions, the corresponding figures were 34·2, 50·9 and 14·7 per cent. Of 250 cases 6 months to 2½ years after treatment with acetylarsan and B.S.P.T., 29·2 per cent. gave negative Kahn reactions and 32·8 per cent. gave + weak or ± reactions.

After mass diagnosis and treatment alone there was some reduction of infectious yaws. When this was followed by permanent treatment facilities, the yaws incidence fell from 4–6 per cent. to under 1 per cent. in several years. When home visiting was also added, no infectious yaws was found in a sample of 1,500 of 7,000 people about 15 months after initial mass treatment ; however, 8 months after all treatment facilities had been withdrawn the incidence had risen to half its original level. Non-infectious lesions decreased more slowly than infectious lesions.

The author discusses the theoretical aims of a yaws campaign as : (1) total eradication of yaws ; (2) elimination of infectious yaws ; (3) reduction to a level that produces no serious suffering or inefficiency ; (4) alleviation of symptoms by treating those who voluntarily seek attention. Since the correction of unhygienic conditions is at present impracticable, chemotherapy must remain the chief weapon in West Africa. Movements of individuals make complete eradication impossible. The author's opinion is that complete eradication is not without the danger of being followed by a big increase in syphilis. The marked tendency of relapse in the secondary stage makes elimination of infectious lesions more complicated than might appear. The reduction of yaws to a low endemic level became the purpose of the campaign reported, and this was achieved. Although treatment of patients presenting themselves does reduce the incidence of yaws, it is not very effective and is relatively expensive.

In conclusion the author says the most practical method of controlling yaws was: (1) mass diagnosis and treatment ; (2) followed immediately by permanent treatment dispensaries ; (3) home visits by a yaws attendant. He regards the second as the most important, but previous mass treatment is essential to reduce the amount of yaws and to accustom the people to the necessity of adequate treatment. At the most successful dispensaries, with the aid of the local chief, 80–90 per cent. of patients attended for 6 injections.

[This is an important paper and reports purposeful and careful work. It provides answers for most of the questions that should be considered before a yaws campaign is started. The expense, based upon existing costs, could be worked out from the data given.] *C. J. Hackett*

REIN, C. R., STERNBERG, T. H., DWINELLE, J. H. & SHELDON, A. J. **Penicillin Therapy of Yaws and Serologic Results.** *Arch. Dermat. & Syph.* 1948, June, v. 57, No. 6, 942–51. [Refs. in footnotes.]

The material upon which this paper is based has been previously reported by DWINELLE *et al.* [this *Bulletin*, 1948, v. 45, 87]. The results of treatment in primary and secondary yaws in Haiti are considered from the results of Kahn reactions one year after treatment with 1,200,000 units of penicillin in watery solution or in arachis oil and wax.

The authors discuss the factors concerned in the reversal of positive serological tests in yaws as in syphilis. They are the stage of the disease, personal factors, initial serological titre, the sensitivity of serological technique, test used and treatment received. They say " the serological response in yaws is

certainly much slower and less satisfactory than that observed in the treatment of early syphilis with a similar amount of penicillin." This may be due to the longer duration of the infections and the shorter period of observation in their patients.

Serological Results in Percentages

Treatment	Cure	Improvement	Relapse	Fastness	Cure and Improvement	Numbers of patients
In water in 4 days	25·1	68·7	4·6	1·5	93·8	200
In oil and wax in 2 days	11·0	81·9	5·5	1·5	92·9	151
In oil and wax in 1 day	6·4	86·4	4·8	2·4	92·8	149

The above table shows that more serological cures followed the longer course of treatment. Over 90 per cent. of cases had remained non-infectious (cure and improvement) throughout the year. [In the earlier paper referred to above it will be seen that clinical relapses are much fewer than serological relapses.]

The authors regard penicillin as probably the drug of choice in the treatment of yaws in the field as the course can be short, clinical results are good and serious untoward effects are absent.

In the discussion, they report that therapeutic trials are being carried out in Haiti with 1,200,000 and 2,400,000 units of crystalline penicillin G in arachis oil and wax in 2- and 4-day ambulatory courses. *C. J. Hackett*

LEPROSY

IGNACIO CHALA H., J. Investigaciones terapéuticas en la lepra. Ensayos con "Promin" o "Promanida." [**The Treatment of Leprosy. Trial of Promin.**] *Rev. Facul. de Med.* Bogotá. 1948, Oct., v. 17, No. 4, 124–59, 18 figs. English summary.

At the Lleras Acosta Institute, Promin (or Promanide) has been tried for periods ranging between 2 months and 1 year and 8 months on 27 suffers from leprosy, only one of whom had had any previous treatment. Nineteen were of the lepromatous type, 2 the tuberculoid, and 6 the neuromacular type. The drug was given intravenously in doses of 2·5–5 gm. daily or on alternate days according to the general physique and condition of the patient. Frequent examinations of the blood were made, but only slight changes were observed. Leprous reaction might occur during the course of treatment, but disappeared if the drug was stopped and benadryl administered.

In the lepromatous patients improvement of the mucous and cutaneous lesions was observed in 56·25 per cent. [11 of the 19 ?]; in the neuromacular type in 33·3 per cent. [presumably two patients], but none with peripheral nerve disturbance showed any benefit. The results generally were better in those in an early stage, but before assessing the results it will be necessary to observe the patients for a long period and avoid jumping to conclusions from early benefit in a few patients. Clinical details are given of all 27 patients and illustrations showing the condition before and after treatment.

H. Harold Scott

CHATTERJEE, S. N. **Injection of Sulphetrone and Diasone in Leprosy : a Preliminary Study.** *Internat. Med. Abstracts & Reviews.* Calcutta. 1949, Jan., v. 5, No. 1, 13–15.

"1. Results of injecting sulphetrone and diasone, in small doses, in 17 cases are reported. A maximum of 5 c.c. of a 3·3 per cent. solution has been used.

"2. Small doses of the drugs by injection, although not producing any appreciable blood level of the drug, produced clinical improvement without producing anemia.

"3. This method of treatment is considered more economical and safe than when the sulphone drugs are administered by mouth.

"4. It is suggested that more extensive trials should be undertaken to find out the minimum dose which will give satisfactory clinical and bacteriological results, without producing anemia or any other toxic symptoms."

HELMINTHIASIS

BARLOW, C. H. & MELENEY, H. E. **A Voluntary Infection with** *Schistosoma haematobium.* *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 79–87, 3 figs.

There is no previous report of a voluntary human infection with *Schistosoma haematobium.* The senior author applied 8 cercariae of *S. haematobium* from 8 different specimens of *Bulinus truncatus* to his left forearm on 31st May 1944 in Egypt. He applied 8 other cercariae from the same snails to the umbilical region on 1st June 1944. On 14th June many cercariae from another 6 snails were applied to the right side of the umbilicus, and the following day some 147 small red papules were seen in this area ; these were considered to represent the minimum of cercariae which had penetrated the skin. On 21st June cercariae from 16 snails were similarly applied ; on the following day there were 61 more papules. It is therefore estimated that a minimum of 224 cercariae penetrated the skin at the four exposures.

Seventy-six days after the major exposure the temperature rose in the late evening ; after slight sweating it had returned to normal by the following morning. Slight daily fever then persisted over several weeks without significant increase in severity. On the 77th day spermatozoa were seen in the urine, and 67 eggs were found in a specimen of seminal fluid. On the 78th day 79 eggs were recovered from a plug of mucus in the stool. On the 106th day eggs appeared in the urine. On the 139th day an itching nodule, half the size of a pea, appeared on the scrotum near the left groin ; bloody serum discharged from this contained eggs of *S. haematobium.* Four or five less well-defined nodules were discovered on the scrotum. On the 149th day a nodule in the left groin was excised and found to contain eggs ; in the excision wound was found a pair of adult *S. haematobium.* From the middle of the fourth month onwards eggs appeared in increasing numbers in the seminal fluid, faeces and urine ; their numbers reached a peak in the seminal fluid at the end of the 6th month, in the faeces at the end of the 10th month, and in the urine between the 8th and 9th months, between 20,000 and 30,000 eggs then being passed daily in the latter.

The symptoms and signs steadily increased until by the 7th month the temperature rose in the evenings to a peak of 39·8 degrees Centigrade, and fell in the early morning after severe sweats to nearly normal. There was general weakness and prostration ; blood and mucus appeared regularly in the stools ; the urine, which contained blood, pus and shreds of mucosa, was passed frequently with associated tenesmus of the bladder and of the anus.

The patient was now confined to bed and he was unable to sleep without sedatives. By the end of the 7th month the infection had become chronic; the temperature did not rise above 37·6°C. and the general condition improved, the patient becoming ambulatory. The number of eggs in the seminal fluid markedly decreased; they were still numerous in the stools and in the urine, the latter containing up to 30,000 per day and much pus, blood, and shreds of mucosa. Repeated differential counts between the 6th and 10th months showed an eosinophilia ranging from 6 to 16 per cent.

Ten months after infection an eight-day intramuscular course of treatment with Fouadin was begun, 47·5 ml. being given. This caused a rise in temperature, with nausea and a persistent asthmatic cough. During treatment and for four days afterwards from 3,000 to 8,000 eggs were passed in the night urine; on the 5th day after treatment the number had fallen to 300 and the eggs passed were dead, no miracidia hatched from them after the 5th day. Fifteen days after completion of treatment the night urine contained only 22 eggs, and two weeks later the seminal fluid contained only 9. Six weeks after the completion of treatment, and one year after infection, viable eggs again appeared in the urine. Fouadin treatment was again given and continued over a period of 19 days, 67 ml. being given on this occasion. Three months after completion of this second course viable eggs were again found in the urine, and these persisted over a period of two months' observation. The patient was then treated with potassium antimony tartrate intravenously on alternate days for 24 days, to a total of 1·5 gm. of the drug. The treatment caused the rather severe side-effects commonly associated with it, but viable eggs ceased to appear after the 15th day of treatment. Urination was frequent and painful after treatment, and pus and blood were still present in the urine. The urinary infection was cleared up by sulphonamide treatment. About this time there was evidence of coronary sclerosis and there was impairment of hearing; later, signs of prostatic enlargement developed and this was dealt with surgically. Sections of the prostate tissue showed only a benign hypertrophy, and no eggs were seen. No further evidence of the worm infestation has been found since the tartar emetic treatment.

The noteworthy features of this carefully observed infection, to which the authors direct attention, were the early appearance of eggs in the seminal fluid, their recovery from the scrotal skin and the demonstration of a pair of worms in a nodule there, the increase in egg production when the infection became chronic, and the failure of Fouadin to eradicate the infection. The hypertrophy of the prostate gland after parasitological cure with tartar emetic is held in part to be due to the previous infection. *A. R. D. Adams*

WATSON, J. M. **Studies on Bilharziasis in Iraq. Part I. Present Status of the Subject.** *J. Roy. Faculty of Med. of Iraq.* 1948, July–Oct., v. 12, Nos. 4/5, 120–34.

The author surveys the information available on the subject of schistosomiasis in Iraq, where it is widespread and serious, not only along the middle and lower Euphrates, but throughout the country except in the extreme north, and is likely to spread even more as the irrigation schemes are developed, unless adequate steps are taken to control it. The incidence cannot be stated exactly, but haematuria has been reported in up to 63 per cent. of school children, and in 100 per cent. of patients in surgical wards of one hospital. Eggs have been found in 6 to 24 per cent. of specimens of urine examined in various State hospitals. These figures may understate the true incidence.

The snail host, as in Egypt, is *Bulinus truncatus*, which finds a favourable habitat in the shallow irrigation ditches with their weedy and sluggish water.

But there is a marked seasonal variation in the numbers of *B. truncatus* found ; they disappear in cold weather (November to May) and reappear in large numbers when the annual floods subside. The disease is very prevalent in the rice-field areas, and the snails, therefore, presumably inhabit those waters. No other snail is known to be a host in Iraq.

The author discusses possible campaigns to control the disease, but points out the need for much more detailed information on the ecology of *B. truncatus* in Iraq before plans can effectively be made. *Charles Wilcocks*

DEWHURST, K. E. **The Tribal Distribution of Bilharzia in East Africa.** *J. Trop. Med. & Hyg.* 1949, Mar., v. 52, No. 3, 60–61.

In 1944, all African troops leaving Kenya for South East Asia were examined for schistosome ova. The author presents the results of examinations of fresh preparations of urinary deposits from members of different tribes in Kenya, Uganda, Tanganyika, Nyasaland and Northern Rhodesia. The total and the tribal results are shown in tables, in which the presence of *S. haematobium* ova is recorded as positive and the finding of red cells and débris (but no ova) as " doubtful ".

The territorial findings were as follows :—

	Kenya	Uganda	Tangan-yika	Nyasa-land	Northern Rhodesia
Total examined ...	804	788	845	1,059	662
Total positive ...	10	10	53	158	94
Total doubtful ...	1	0	7	17	9
Percentage positive ...	1·2	1·2	6·2	14·9	14·6

The higher percentage of positive findings in the more southerly territories is noteworthy.

The territorial percentages are roughly reproduced in the individual tribal percentages, although the figures for the latter are mostly relatively small (in 22 out of 32 tribes the total number of men was less than 100). There was, however, some variation. It is noted, for example, that in Kenya, all 10 positive results came from 101 members of the Jaluo tribe ; in Tanganyika, the Makua and Mwkuma (80 men each) showed 15 and 10 positives, respectively : in Nyasaland, 41 of 168 (24 per cent.) Jao were positive : and in N. Rhodesia 25 of 76 (39 per cent.) Chewa and 23 of 45 (51 per cent.) Tumbuka. The other tribal percentages were fairly close to the averages for the territories to which the tribes belonged.

The author considers that the results give a rough estimate of the distribution of schistosomiasis in East Africa, but adds that it is somewhat conservative, since the subjects examined were young " healthy " Africans passed fit for military service. *H. J. O'D. Burke-Gaffney*

BENNIE, Iris. **Urinary Schistosomiasis : the Best Time to obtain Specimens : the Effect of Specific Therapy on Egg Output.** *South African Med. J.* 1949, Feb. 5, v. 23, No. 6, 97–100, 1 fig.

The excretion of eggs even in active *Schistosoma haematobium* infections is notoriously irregular. One hundred and twenty-eight African school children were found to be suffering from active urinary schistosomiasis on a single urine examination in November 1947 ; they were similarly re-examined in July 1948.

No specific treatment had been given, but at the second examination only 95 (74·2 per cent.) were passing eggs. There have been various explanations for the irregular egg output and fluctuations in their numbers in the urine. In clinical practice it is usual to examine the terminal urine from the first emptying of the bladder on rising in the morning, in the belief that eggs pass into the urine from the bladder during the night and their number is increased by distension of the bladder. Specimens of urine from a young male African suffering from *S. haematobium* infection, employed on domestic duties, were subjected to carefully controlled egg counts each morning and afternoon for a month. From close observation of this patient it appeared that the number of eggs passed in the urine was closely related to the amount of physical exertion just before micturition, particularly if the exercise involved movement of the musculature of the lower abdomen. Examination of the early morning urine in this patient might well have failed to reveal the presence of urinary schistosomiasis ; but examination of the afternoon specimens invariably yielded eggs. The common practice of examining terminal urine from an early morning specimen should therefore be abandoned, as reliance cannot be placed on examinations of urine from patients who are recumbent. Indeed, it is desirable to get patients to undertake exercise before passing urine when searching for schistosome eggs.

This same patient was treated with a single dose of Miracil D by the mouth daily, for six consecutive days. The daily dosage ranged from 1 to 1·3 gm., and the total was 121·6 mgm. per kgm. On the second day the average output of eggs in the morning specimen rose, and there was a fall in that of the afternoon specimens. This was possibly due to the fact that the patient rested throughout the treatment, but the increased morning output, it is suggested, may have been due to stimulation of the worms by Miracil D. The number of eggs in both specimens rapidly diminished thereafter, and nine days after completion of treatment there were only a few blackened and calcified ova in the urine.

Toxic side-effects were loss of appetite, slight abdominal pain, severe headache and epistaxis, dizziness and weakness. These rapidly disappeared after completion of the treatment. There was some yellow staining of the skin of the palms and of the soles for about a week. *A. R. D. Adams*

Blair, D. M., Loveridge, F. G., Meeser, C. V. & Ross, W. F. **Urinary Schistosomiasis treated with Miracil D.** *Lancet.* 1949, Feb. 26, 344–6.

Blair *et al.* (1947) [this *Bulletin*, 1948, v. 45, 526] have already recorded the disappointing therapeutic results of treatment of *S. haematobium* and *S. mansoni* infections in man with Miracil D, given for two or three weeks in a daily dosage up to 4 mgm. per kgm. of body weight. Subsequently they found that a bigger daily dosage for a shorter period was effective in curing *S. haematobium* infections. They now report the results of oral treatment with Miracil D of 82 African children suffering from *S. haematobium*, or *S. haematobium* and *S. mansoni*, infections in Salisbury, S. Rhodesia. Daily doses of 15 mgm., 20 mgm., or 25 mgm. per kgm. of body weight were given by the mouth ; the full amount, to the nearest 200 mgm. tablet, was spread over five days in ten doses. The early results with the lower two dosages were so promising that the highest was later abandoned. All the children were re-examined over a period of twelve weeks after the completion of treatment. The results of treatment are set forth in a table. From this it is evident that of 53 children suffering from *S. haematobium* infection who completed the five-day treatment, 42 were cured ; that is, no eggs whatsoever were found over the twelve-weeks period of observation and no active miracidia were found in the urine during this period. Four of the 53 were not cured ; in the

case of the remaining seven a few dead eggs were found. Twenty-nine other children, who were similarly affected, received the treatment over a period which approximated to the five-day course. The results of treatment in these cases were very similar. There were toxic side-effects in about half the children ; these consisted of abdominal pain, loss of appetite, nausea, headache and dizziness ; none was severe enough to cause a child to seek medical aid. As the lowest dose, 15 mgm. per kgm. daily, produced results at least as satisfactory in eradicating *S. haematobium* infections as the two higher dosages, there appears to be no purpose in exceeding it. Of 15 patients passing *S. mansoni* eggs in the stools, 13 were passing *S. haematobium* eggs in the urine ; all 13 were cured of their *haematobium* infections by the course, but only 2 of the patients in this group ceased to pass *mansoni* eggs. Of the two patients with pure *mansoni* infections one was cured but the other was not. Thus of 15 patients with *S. mansoni* infection only 3 were cured, and this parasite would appear to be much more resistant than *S. haematobium* to Miracil D. The drug is expensive by African standards, the cost being about 8 shillings per patient ; its advantages are that it can be given orally, and to ambulatory patients without skilled assistance or expensive equipment. [In a later note, in the *Lancet* of 12th March, Blair adds that of 74 children shewn to have been cured, after a 3-months follow-up, 51 have now been re-examined after 6 months. Of these, 1 is now passing live eggs, 12 are still passing blackened dead eggs and the remainder are not passing any eggs.] *A. R. D. Adams*

RAIL, G. A. **Intensive Treatment of Schistosomiasis with Sodium Antimonyltartrate.** [Correspondence.] *Lancet.* 1949, Mar. 26, 548.

The author, writing from Gatooma, S. Rhodesia, refers to the work of ALVES, ALVES and BLAIR and of GIRGIS AZIZ on the intensive treatment of schistosomiasis with antimony [this *Bulletin*, 1945, v. 42, 815 ; 1946, v. 43, 344, 752 ; 1948, v. 45, 446].

He has treated 20 patients with a 30-hour course of sodium antimonyl tartrate in a dosage of 1 grain per 12 lb. of body weight in six intravenous injections. In the first 6 cases, each dose was diluted in 10 ml. of glucose saline, but later this was replaced by sterile water. Not less than 5 minutes was taken over each injection, the time being 10 minutes with the heavier doses. Half an hour before each injection, tincture of codeine (B.P.C.) was given in a dose of 1 fluid drachm : this notably reduced irritant effects. The patients were confined to bed during the injections and for 12 hours afterwards : before and during treatment they were encouraged to take large quantities of glucose. Diet was unrestricted and a high protein intake was encouraged.

In 10 cases in which ova had been found, they were absent six months after treatment : two of these were negative after 8 months and two after 9 months.

Three patients showed no toxic reactions : 17 had slight headache, lassitude and inertia, but only 2 of them had severe reactions. One of these 2 patients had severe phlebalgia and vomiting during the second injection, and this necessitated splitting of the third injection of 2½ grains into two (1 grain and 1½ grains, respectively). He had no subsequent reactions. The second patient developed a severe conjunctivitis and peeling of the hands three days after completion of the course. These conditions cleared up in 10 days.

Desquamation was also seen in 4 other cases and conjunctivitis in 2. Cough developed in 9 cases, vomiting in 7, fever in 6 and erythema in 1. None of the more serious reactions (jaundice, haemorrhages or cardiac failure) was noted. The minor symptoms disappeared within 14 days, leaving many of the patients feeling better than they had for some years. The author suggests that the toxic effects are not so severe as might have been expected or had been feared by

many who had misgivings about the " fast antimony " treatment. He considers that his results are in harmony with those of Alves and Blair. Three cases (including the two with severe reactions) are described in detail.

H. J. O'D. Burke-Gaffney

PONCE PINEDO, A. M. La bilharziose à *S. mansoni* dans la République Dominicaine. [**Schistosomiasis due to** *S. mansoni* **in the Dominican Republic.**] *Arch. Inst. Pasteur de la Martinique.* 1948, Jan., v. 1, No. 1, 12–16.

In 1942 the author discovered the first case of schistosomiasis to be reported in the Dominican Republic, and now gives details of six. All were found near the town of Hato Mayor, and in streams nearby there were many specimens of *Australorbis glabratus*. Fork-tailed cercariae were emitted by 5 per cent. of these snails [3 per cent. is the figure given in another place]. Infection of rabbits showed that they were cercariae of *S. mansoni*. *Charles Wilcocks*

RODRIGUEZ-MOLINA, R., LANG, A. A., ACEVEDO, C. E. JIMENEZ-TORRES, C. F., with the technical assistance of R. DIAZ. **Treatment of Schistosomiasis mansoni with Antimony Lithium Thiomalate (Anthiomaline).** *Bol. Asoc. Med. de Puerto Rico.* 1948, Oct., v. 40, No. 10, 277–81.

The authors in Porto Rico treated 25 unselected cases of *S. mansoni* infection with anthiomaline. All were Porto Rican males of 24 to 59 years and fifteen were asymptomatic. Diagnosis was by finding ova in the stool. Stool counts were made before, during and after treatment and in 20 cases rectal biopsies were examined after treatment and during follow-up.

The drug was given intramuscularly in doses of 3 cc. every other day for a total of 30 cc.

In 22 cases, stools were free of ova before the end of treatment : the other 3 passed dead ova before treatment was completed. Stools became negative between the 5th and 8th days. For one to three weeks after treatment had ceased, 2 to 10 specimens of stools from each patient was examined : all were negative during the period.

One rectal biopsy contained 21 living ova, although stool examination made daily for a week before and after treatment had been negative. In the other 19 cases, seven showed dead ova in rectal biopsy and 12 were negative.

Follow-up studies for 3 months were available in 9 cases. Four remain free of ova in the stools and two have shown dead ova in rectal biopsy. The other three were positive for live ova in stools and biopsy alike for 2 to 3 months.

Varying degrees of pain—sometimes severe—occurred at the site of injection in 15 patients. In one, desquamation of the skin of the hands and feet occurred. Five complained of pain in both shoulder joints and one had flushes and dizziness for as long as 3 hours after each injection.

The authors conclude that while anthiomaline appeared to possess excellent parasitotropic action against *S. mansoni*, as judged by immediate results, follow-up studies month by month are necessary for the final evaluation of any drug employed in the treatment of this infection.

H. J. O'D. Burke-Gaffney

ABBOTT, R. T. **Mollusks and Medicine in World War II.** Reprinted from *Smithsonian Report for 1947*, 325–38, 8 figs. (6 on 3 pls.).

This paper comprises a general account of the part played by molluscs in affecting the health of American forces during the last war, together with

a discussion of the risks of introducing snail-borne diseases into America, after the return of infected troops from abroad. These observations and discussions are mainly concerned with *S. japonicum* and its vector, *Oncomelania*, but they also include a brief description of other trematode infections, and the article concludes with an account of the venomous cone shells of the coral reefs and the lesions which may follow their bite. This article is written with the view of "putting across" the story of molluscs as carriers of disease in a way which will be understood by laymen as well as doctors. To attain his object the author uses popular, and sometimes flamboyant, language, but the reader must not let himself be deterred from finishing the article by such phrases as "up through Gloucester, Finschhafen, and Hollandia many of the men had come, fighting Japs with a rifle in one hand, warding off malaria with a yellow atabrine pill in the other". Dr. Abbott knows his snails and his schistosomes, and his article is packed to overflowing with recent information of value to the expert as well as to the novice. During World War II, unlike World War I, the services of the entomologists were fully utilized from the beginning, but it would appear, however, that the services of the malacologists did not receive such early recognition, for Dr. Abbott writes concerning the outbreak of schistosomiasis at Leyte "the use of the latter, a mollusk man, represented the first time that a military organization had employed a malacologist for snail research". *R. M. Gordon*

i. Mao, C. P. **A Review of the Epidemiology of Schistosomiasis japonica in China.** *Amer. J. Trop. Med.* 1948, Sept., v. 28, No. 5, 659–72. [Numerous refs.]

ii. —— & Li, L. **Snail Hosts of** *Schistosoma japonicum* **in the Soochow-Wusih Area, Kiangsu, China.** *J. Parasitology.* 1948, Oct., v. 34, No. 5, 380–85. [15 refs.]

i. This is a valuable summary of the subject. Schistosomiasis in China is found in places with abundant, slow-moving watercourses, and fresh-water lakes, leading to canals and irrigation ditches which supply water to the rice fields. The climate is never very cold, the soil is rich in humus and the rainfall is 1,000–1,600 mm. per annum. Animal hosts include dogs, cats, rats, cattle, buffaloes, sheep and goats, and, in the Philippine Islands but not in China, horses and pigs.

A list of 17 snails which the author states to be hosts of *S. japonicum* is as follows :—*Oncomelania hupensis, O. schmackeri, O. moellendorffi, O. longiscata, O. crassa, O. costulata, O. anhuinensis. O. elongata, O. multicosta, O. yaoi* [misprinted as *vaoi*], *Katayama formosana, K. fausti, K. cantoni, K. lii, K. tangi, Schistosomophora slateri, S. robertsoni.* He does not include *K. nosophora* which occurs in Japan, on the grounds that in China the name should be *K. fausti.* He doubts the value of the radular pattern as the key to classification of these snails, but has largely followed Bartsch [*Smithsonian Misc. Coll.*, 1936, v. 95, No. 5, 1–60] in his nomenclature, and this is based on the radular pattern.

The habits of the snails are described ; they become infected chiefly in early summer, and the intra-molluscan cycle of the worms occupies 8–9 weeks. In China, human faeces are used on a large scale, and often in the fresh state, for fertilizing the rice fields, and schistosome eggs in the faeces so used are viable when the land is covered with water containing the snails. In the endemic areas rice is the main crop, and the disease is, in fact, particularly common in rice farmers. Women acquire it when they wash clothing in infected water, and fishermen in the course of their work ; children bathe in the water.

Schistosomiasis has been reported in 138 *hsiens* of some 10 provinces in China, the most heavily infected area being round the three big lakes, Taihu, Tungtinghu and Poyanghu. On the basis of the incidence rate found in a large number of surveys (21 per cent.), an estimate may be made that there are over 5 million cases in China, but the author suspects that this would be an underestimate.

ii. In this paper the authors give a list of snail hosts of *S. japonicum* in China, which contains 16 of the 17 named above. They state their reasons, based on detailed work, for thinking that, for separating these snails into species, a better basis must be found than radular formula, sculpturing, or the colour of the shell. They summarize the paper as follows :—

"One hundred and forty-eight oncomelaniid snails known to be capable of transmitting oriental schistosomiasis which were collected from 7 villages near Soochow-Wusih, Kiangsu, China, were subjected to individual observation regarding the number of whorls, length and width, number of axial ribs for the last three whorls and denticle count of the radular teeth. It was found that the denticle count varies to such an extent that it is not a dependable criterion for separating species or genus in this group. The same conclusion is suggested for shell characters."

Charles Wilcocks

HOFFMANN, W. H. & GUERRA, A. Distoma hepatico originando un absceso muscular. [**Fasciola hepatica originating in a Muscle Abscess.**] *Rev. Kuba Med. Trop. y Parasit.* 1949, Jan.–Feb., v. 5, Nos. 1/2, 11–12.

Report of a case with the parasite in an abscess of the rectal muscle.

GALLIARD, H. Infestation expérimentale par les larves plérocercoides de *Diphyllobothrium mansoni* au Tonkin. [**Experimental Infection by Plerocercoid Larvae of** *Diphyllobothrium mansoni*.] *Ann. Parasit. Humaine et Comparée.* 1948, v. 23, Nos. 3/4, 203–13, 3 figs. [12 refs.]

The site of penetration, the migrations and the lesions caused by plerocercoid larvae of *D. mansoni* after being swallowed by a number of different experimental animals, were investigated by the author. The larvae used in the experiment were obtained from *Rana tigrina*, *R. limnocharis* and *Tropidonotus piscator*.

Rana tigrina.—Penetration took place through the stomach wall and was either direct and rapid or involved a resting period between the mucosa and the muscle layer where the larvae remained for as long as 20 days. Subsequently they were found in various internal organs before they ultimately made their way to the muscles. No lesions were produced by the passage of the worms.

Other batrachians and reptiles were also infected with ease, but no reactions took place.

Guineapig.—Seven out of eight guineapigs were successfully infected, and the larvae were found about 18 hours later on the external surface of the stomach wall. Penetration was not direct and there was strong host-tissue reaction in the form of ulceration and congestion. In an infection of 60 days' duration, the larvae in contact with visceral organs caused inflammatory reactions and adhesions. No intramuscular migration was observed.

Rat.—Twenty-four hours after ingestion, three larvae were found in two rats, in the pancreas, the stomach wall and free in the peritoneal cavity. In a third rat, 36 days after ingestion, 25 larvae were recovered, in the stomach wall and on its surface, on the liver and spleen and in muscle. No lesions nor reactions resulted.

Rabbit.—After 17 hours, 3 larvae were found on the stomach wall surface and 2 near the pancreas which caused haemorrhage. Invasion of musculature was observed in a rabbit 30 days after exposure.

Dog.—Successful intestinal infections were obtained on feeding dogs with plerocercoids from *Rana tigrina*, from tadpoles of *R. limnocharis* and from *Tropidonotus piscator*, but single plerocercoids from the human eye failed to infect dogs.

Cat.—Ten plerocercoids were fed to a cat which showed eggs in the stools after 30 days, and after 79 days, 5 worms, 60 cm. long, were recovered from the intestine. Another cat fed with 20 larvae produced 8 worms after 28 days.

J. J. C. Buckley

LANDELLS, J. W. **Intra-Medullary Cyst of the Spinal Cord due to the Cestode *Multiceps multiceps* in the Coenurus Stage. Report of a Case.** *J. Clin. Path.* 1949, Feb., v. 2, No. 1, 61–3.

A coenurus cyst, larval stage of the taeniid cestode *Multiceps multiceps* was removed from the spinal cord, at the level of the fifth and sixth thoracic segments, of a girl aged 14. She was suffering from spastic paraplegia of acute onset at the level of the sixth thoracic segment which was preceded by " pins and needles in the legs " of increasing intensity. The removal of the coenurus brought no improvement in the paralysis, but a second operation a month later revealed no more cysts nor visible cause for the paralysis. Ten months later there was slight sensory recovery but no motor recovery. The Casoni test was negative and there was no eosinophilia.

Comparative histological study of human brain material which had a similar infestation revealed that there is a natural line of cleavage between the cyst wall and the brain and that there is a reaction area about 3 mm. deep in the latter, from the cyst wall outwards. This comprises four zones, of which the third or main zone of cellular infiltration is up to 700μ in thickness. In the fourth zone there is evidence suggesting severe compression. It is observed that a corresponding zone of chronic granulomatous inflammation in the spinal cord would be of greater functional importance than in the brain and this would explain the non-recovery after removal of the cyst in the present instance.

Further helminthological details on the parasite, the first record of its kind from the human spinal cord, are provided, and illustrated by photomicrographs, [see also CRUSZ, this *Bulletin*, 1949, v. 46, 65] together with clinical details of another case of human coenurosis in England [*ibid.*, 1942, v. 39, 631].

J. J. C. Buckley

BENCHIMOL, A. S. Quiste hidatídico de órbita. [**A Hydatid Cyst of the Eye.**] *Prensa Méd. Argentina.* 1948, Nov. 19, v. 35, No. 47, 2241–5, 3 figs. [20 refs.]

CHAKRABARTY, R. **Surgical Condition arising out of Impaction of Round Worms in the Intestine.** *Calcutta Med. J.* 1948, Nov., v. 45, No. 11, 420–21.

Report of a case.

FALLIS, A. M. *Ascaris lumbricoides* **Infection in Guinea Pigs with special reference to Eosinophilia and Resistance.** *Canadian J. Res.* Sect. D. Zool. Sci. 1948, Oct., v. 26, No. 5, 307–27, 20 figs. (5 on 3 pls. (2 coloured)). [15 refs.]

" Clinical symptoms of *Ascaris* infection were produced in guineapigs by feeding several thousand eggs. Such infections caused a temporary loss in weight and severe congestion of the lungs but no elevation in temperature was observed. An eosinophilia was associated with infection and it reached higher levels following repeated infections. Injections of antigen caused a temporary rise in the number of eosinophiles. Guineapigs developed a resistance

as a result of infection. Some resistance was retained for at least 15 weeks following infection. A slight passive resistance resulted from injections of large quantities of serum from resistant animals and from injections of a liver extract prepared from resistant animals. The resistance was apparent from the amount of congestion in the lungs and the number and size of the larvae recovered from the lungs. The eosinophiles *per se* were not responsible for the resistance observed. It appeared that the body defences, in resistant animals, acted against the parasites before they reached the liver and more especially before they reached the lungs."

BUTTS, D. C. A. La infección filárica en Costa Rica. Contribución del Hospital de la Compañia Bananera de Costa Rica en Limón. [**Filariasis in Costa Rica.**] *Rev. Med. Costa Rica.* 1948, May, v. 8, No. 169, 103–8.

The city of Limón has a population between 10,000 and 12,000 ; the persons examined were distributed in four districts, or perhaps we should say the area in which examinations were made was divided into four, namely the Port area, the Hospital zone, Jamaica Town, and Cieneguita. Samples of blood were taken between 10 p.m. and 6 a.m., the majority between 10 p.m. and 2 a.m. Altogether 1,306 persons were examined. In Jamaica Town and Cieneguita 1,006 samples were taken from 269 persons and 101 specimens [the number of individuals is not stated] were positive for filarial embryos. Details of the other districts are not given, but it is stated that the incidence on the Pacific coast was 1 per cent., that on the Atlantic coast 15 per cent. The age percentage of infestation is given as : Up to 10 years 18, 11–20 years 36, 21–40 years 36, 41–60 years 10 per cent. ; the youngest was 4 years of age, the oldest 55 years.

It is stated that the disease was originally imported from Jamaica and the West Indies. [It is not possible to say whether Jamaica was a focus of filariasis many years ago, but the abstracter while stationed for several years in the island examined many thousands of specimens of blood but found only four cases of filarial infection and all four were imported and were sent back home as soon as possible to avoid infection of others in the island.] The common mosquitoes in Costa Rica are *Aëdes aegypti* and *Culex quinquefasciatus* [*C. fatigans*]. *H. Harold Scott*

OLIVER-GONZÁLEZ, J., SANTIAGO-STEVENSON, D. & MALONADO, J. F. **Treatment of Filariasis bancrofti with Hetrazan. Follow-up Observations Fifteen Months after Treatment.** *J. Amer. Med. Ass.* 1949, Jan. 29, v. 139, No. 5, 308–9.

At the end of 1947, the authors [this *Bulletin*, 1948, v. 45, 353] reported on the immediate results of administration of Hetrazan (1-diethyl-carbamyl-4-methylpiperazine) in 26 cases of *Wuchereria bancrofti* infection. The large majority of these cases were followed month by month for 15 months.

Of the original 26 patients, 23 were seen at the end of 15 months. One patient only had any clinical symptoms during this period that might be attributed to filariasis ; he had a painful femoral gland and swelling of the upper third of the thigh, which subsided after a week.

Thirteen patients showed no microfilaria at the end of the period and of these 3 had shown microfilariae since the 10th month but only in insignificant numbers (1 to 4). The remaining ten patients showed 30, 19, 14, 11, 4, 4, 3, 1, 1, and 1 microfilariae, respectively, in 60 cm. of blood ; all had shown a much larger number before treatment. These ten patients in whom the infection persisted were those to whom the lowest dosage had been given ; although one had received a dosage of 2 mgm. per kgm. 3 times a day for 16 days (total

0·096 gm.) the others had less than a total of 0·04 gm. The largest total dose given was 0·132 gm. per kgm.

The authors conclude that Hetrazan given in adequate dosage to patients with *W. bancrofti* infection will clear the blood stream of microfilariae for periods of at least 15 months, and that there is no evidence of lymphatic disease that might be attributed to the filaricidal action of the drug. *L. E. Napier*

GORDON, R. M., CHWATT, L. J. & JONES, C. M. **The Results of a Preliminary Entomological Survey of Loiasis at Kumba, British Cameroons, together with a Description of the Breeding-Places of the Vector and Suggestions for Future Research and possible Methods of Control.** *Ann. Trop. Med. & Parasit.* 1948, Dec., v. 42, Nos. 3/4, 364–76, 1 map & 2 figs. on pl.

This is an account of a brief survey of loiasis undertaken in June and July, 1948, at Kumba in the British Cameroons at the request of the Colonial Medical Research Committee.

The population of the township of Kumba consists of some thirty Europeans and about six thousand Africans. The Africans are mainly centred on a ridge 850 feet above sea-level between the rivers Kumba and Meme ; the European residential quarters and certain public offices and institutions are set on nearby elevations. Streams run in the valleys between the occupied higher elevations, and the slopes of these valleys, as well as the stream-beds, are thickly overgrown with bush ; small tributaries course down the slopes. The streams are generally brisk in flow with rocky bottoms, but in parts the flow is slow and the bottom is sandy with a mud covering overlaid in turn by decaying leaves.

In previous surveys, loiasis infection in the Africans varied from 3·7 to 9·0 per cent. of children, and 16·5 to 23 per cent. of adults, with microfilariae in the blood ; the present survey shows that about 25 per cent. of the Europeans had at one time or another shown evidence of infection, some of them being infected within less than twelve months of arrival. On the other hand, microfilariae have seldom been found in African children of less than seven years of age.

Available records and the authors' survey indicate that only *Chrysops silacea* and *C. dimidiata*, both known to be vectors of *Loa loa*, occur in the vicinity of Kumba, and that the former is apparently about 15–24 times more abundant. The observations recorded in this preliminary paper are concerned with *C. silacea* almost exclusively ; the specific identity of the *Chrysops* larvae collected is, however, uncertain and requires further confirmation. *Chrysops* was biting from about 8·30 a.m. until after 4·30 p.m., occurring commonly indoors in dwellings at densities of from 0·3 to 1·0 fly per boy hour, the highest catches being in bungalows close to bush. Only female flies were seen despite repeated search in a variety of environments under different conditions for the male ; high forest canopy was not examined although suspected as a possible haunt of the male. Man appears to be the chief host, and, probably secondarily, monkey ; feeding was observed on the few cattle available, as well as on the usual small animals of the laboratory ; there was no visual evidence in fly dissections of blood other than mammalian. Females captured in or near bungalows rarely showed any signs of advanced ovarian development (of 500 examined, 492 possessed immature ovaries or showed only slight development) ; there is other evidence that the females are not in the vicinity of dwellings in the phase when the ovaries are developing prior to oviposition. All of 19 flies examined particularly showed spermatozoa in the spermatheca.

Chrysops larvae, presumed to be *C. silacea*, were found in the streams but localized to the more stagnant parts and in the mud beneath the decaying

leaves. In the time available little work could be done on the breeding-out of larvae.

Infection rates for presumed *Loa loa* infections in *Chrysops* in three different surveys were 2 positive out of 32, 12·4 per cent. positive out of 903, and 7·8 per cent. with microfilariae (4·3 per cent. with infective forms) in 460 flies taken in bungalows in the present survey.

It is estimated that a European is liable to infection at least once in five days. The infection rate in Europeans and in Africans is less therefore than might be expected. Three explanations are put forward and briefly discussed. These are as follows :—(1) Infective larvae do not always successfully penetrate into the human skin. (2) Many persons develop an immunity to further infection after earlier unobserved or non-patent infections (this is discounted as unlikely), (3) the absence of microfilariae is due to unisexual infections, failure of worms to mate, or chance absence of the microfilariae in the blood on the occasion of the blood-film examination. This third point of view is supported not only by studies on animal filariasis but also by histories of Calabar swellings or migrating adult *Loa loa* in persons with negative blood films.

The possibility of control measures is reviewed tentatively.

Chrysops larval control.—There seem to be good prospects of satisfactory if not complete control of the localized breeding places by clearing bush and canalization ; the effectiveness of insecticides should, however, be investigated ; the possibility of increased facility for anopheline breeding must be borne in mind.

Protection of the individual.—Screening of at least one dayroom per bungalow is suggested. Wide mesh netting soaked in 60 per cent. dimethyl phthalate [DMP], if used as for a window-screen, is shown to be ineffective as a barrier to *Chrysops*. Flies were effectively repelled for four hours when a 60 per cent. DMP preparation (" Liquid Mylol ") was applied to exposed skin ; " Mylol Cream " containing 30 per cent. DMP was ineffective. Clearing of bush from around bungalows seems likely to diminish the fly density in their vicinity.

A final section on future research is not readily summarized and should be consulted in the original. The many aspects of entomology and helminthology mentioned are indicative of our present paucity of knowledge on loiasis. The Kumba area is recommended as an ideal centre for further intensive studies on this disease and its control. *D. S. Bertram*

NETTEL F., R. Contribución al estudio de las condiciones naturales de las zonas de oncocercosis en Chiapas. [**Onchocerciasis in Chiapas, Mexico.**] *Medicina*. Mexico. 1949, Jan. 25, v. 29, No. 572, 21–32, 7 figs. [16 refs.] English summary.

Onchocerciasis in South Chiapas is largely confined to the high levels. In one village, 1,000 metres above sea-level, with only 400 inhabitants, 65 per cent. were infected. Here the rainfall is heavy, 320 cm. a year, and rain fell on 181 days. At another focus in the north, where the disease is also prevalent though less than in the former, the southern, focus, the rainfall is 80–160 cm. on 31–60 days in the year.

Captures of Simuliidae were made during one hour in the morning (7–8 a.m.) and one hour in the afternoon (4–5 p.m.), during the wet season, April–September 1946, and 11,657 were caught. Of these, 10,296 (88·3 per cent.) were *S. ochraceum*, 983 (8·4) *S. callidum*, and 378 (3·2) *S. metallicum*. Though patients come down to the lower levels, they do not transmit infection because *S. ochraceum* is not found there. *H. Harold Scott*

MAZZOTTI, L. Estudio acerca del tratamiento de la oncocercosis. [**On the Treatment of Onchocerciasis.**] *Medicina.* Mexico. 1949, Jan. 10, v. 29, No. 571, 1–5.

After a few remarks on the use of the chloride of 1-diethylcarbamil-4-methylpiperazine, or Hetrazan, in filariasis in general, the author records its use in onchocerciasis. The drug produces more severe reactions in this infestation than it does in infestation by *W. bancrofti*, so smaller doses are given, starting with 2 mgm. per kilo bodyweight, thrice daily by mouth, and increasing to 4 mgm., but limiting the course to seven days.

He has treated in this way 65 patients and has observed 36 of them during a period of 1–14 months. In all of them there was a diminution in the number of cutaneous embryos found, in some to such a degree that they could be discovered only with difficulty. The adults in the nodules showed an " altered vitality ". After 4–8 months in some cases the embryos were again becoming present in larger numbers and it was noticed that these were all in patients with nodules which had not been extirpated.

In the cases of seven patients observed for 6–14 months, five had remained free, and two were showing cutaneous embryos again. The eye symptoms cleared rapidly and the microfilariae disappeared " in a few days ". In this regard, of seven patients under observation for 10 months, in one only had the embryos reappeared in the eyes. *H. Harold Scott*

VARGAS, L. Control de la oncocerciasis. [**Control of Onchocerciasis.**] *Bol. Oficina Sanitaria Panamericana.* 1948, Dec., v. 27, No. 12, 1150–59. English summary.

This paper summarizes the principal features of onchocerciasis as it is found in the New World. The author begins by stating the primary requisites for the control of any disease : sufficient funds, organization, enough patients and susceptible people who are interested in the control of the disease and lastly a favourable environment for the work. Control may then be started (*a*) if the incidence of the disease is sufficiently high, and (*b*) if there is an appreciable death rate. The incidence of onchocerciasis is not always easy to elucidate and unless similar methods are employed the results of different surveys may not be comparable. The best diagnostic procedure is to observe the following : (1) skin biopsy, (2) eye lesions, (3) allergic phenomenon, (4) eosinophilia. The transmission quotient of onchocerciasis is defined as the proportion of 100 individuals who receive an infecting bite in a given period of time. Evidence of infection is absent in children under 1 year, it becomes manifest in early life and reaches a maximum before maturity.

The three vectors of the disease in Central America are *Simulium ochraceum*, *S. callidum* and *S. metallicum*. These produce a maximum of 5 generations in the season which lasts from October till the end of March. Anti-larval control by DDT or " Gammexane " during the dry season is recommended as the best way of getting rid of the disease. *P. C. C. Garnham*

DEFICIENCY DISEASES

MAINZER, F. **Menstrual Disorders in Pellagra.** *Acta Med. Scandinavica.* 1949, Jan. 20, v. 132, No. 4, 384–91. [46 refs.]

" Amongst 11 women of childbearing age, suffering from pellagra, menstruation was normal in only one patient. Amenorrhea was present in 3,

menorrhagia or metrorrhagia in 4 and in the remaining 3 patients a reliable history could not be obtained.

"Experimental and clinical observations have shown that of the organs concerned with the sexual cycle the function of the anterior pituitary, the adrenals and the liver are impaired by vitamin B deficiency.

"There is evidence strongly pointing to a pituitary origin of the amenorrhea in pellagra. Arguments are put forward supporting the view that the menorrhagia and metrorrhagia in pellagra are due to insufficient inactivation of estrogen resulting from impaired liver function.

"The rôle of adrenal damage present in pellagra and of ovarian failure induced by a hypothetical direct influence of the deficiency state is discussed.

"Further investigations in pellagrins by means of biopsy of vaginal mucosa and endometrium and by estimation of the urinary output of gonadotropic hormone, estrogen, 17-ketosteroids, creatinine, creatine and phosphorus are suggested."

HAEMATOLOGY

SPIES, T. D., SUAREZ, R. M., GARCIA LOPEZ, G., MILANES, F., STONE, R. E., LOPEZ TOCA, R., ARAMBURU, T. & KARTUS, S. **Tentative Appraisal of Vitamin B_{12} as a Therapeutic Agent.** *J. Amer. Med. Ass.* 1949, Feb. 19, v. 139, No. 8, 521–5, 3 figs. [Refs. in footnotes.]

The present communication is concerned with the answer to two questions :—

(1) What is the effect of vitamin B_{12} on blood regeneration in persons with nutritional macrocytic anaemia, tropical sprue and pernicious anaemia ?

(2) What is the effect of vitamin B_{12} on subacute combined degeneration in persons with pernicious anaemia ?

Diagnostic criteria were : macrocytic hyperchromic anaemia, red blood cell count of 2,500,000 or less, colour index of 1·0 or more ; megaloblastic arrest of the sternal bone marrow : additional criteria were absence of free hydrochloric acid in the gastric contents after histamine stimulation (for pernicious anaemia) ; presence of free hydrochloric acid in the gastric contents and diarrhoea with brown stools (for nutritional macrocytic anaemia) ; presence of free hydrochloric acid, flat glucose tolerance curve, diarrhoea with fatty stools and emaciation (for sprue). The group included 4 patients with nutritional macrocytic anaemia, 1 with non-tropical sprue, 11 with tropical sprue and 5 with pernicious anaemia. Fourteen additional patients with pernicious anaemia and subacute combined degeneration were selected for the purpose of studying the effects of vitamin B_{12} on the nerve changes.

Vitamin B_{12} per unit of weight is the most effective antianaemic substance at present known. It has been found to produce haematological response in pernicious anaemia, nutritional macrocytic anaemia as well as in tropical sprue. So far it is the only pure chemical substance known which has been shown to be effective in relieving the symptoms of subacute combined degeneration.

Shortly after the administration of vitamin B_{12}, a reticulocytosis occurs and is followed by increase in the number of red cells, blood platelets and haemoglobin : simultaneously with the reticular rise patients volunteer that they feel stronger. An increase in appetite is noted. The nerve symptoms of subacute combined degeneration remit and the glossitis present in cases of macrocytic anaemia heals in a spectacular manner.

In tropical sprue there is cessation of diarrhoea and a tendency for the stools to return to normal size and colour.

The dosage of vitamin B_{12} necessary to bring about these results varies greatly from patient to patient. Slight effects have followed the injection of as little as 4 microgrammes and complete failure has ensued after a much larger dosage of 10 microgrammes, but response has been registered in every instance in which several times these amounts were administered. It is suggested that the average patient will respond to the maximum degree to 100 microgrammes or less. On an average a minimum response is registered after 10 microgrammes.

Vitamin B_{12} has no effect upon leucopenia of infectious diseases, or of drug idiosyncrasies, idiopathic purpuras, secondary anaemias, aplastic anaemia or the leukaemias.

In the general management of the macrocytic anaemia syndromes it is necessary to prescribe an amount of vitamin B_{12} in excess of that just necessary to maintain the patient's blood at a normal level and to prescribe a diet rich in animal protein as well as to treat all co-existing disease and any complicating factors. A feature which should occasion comment is the dramatic rapidity with which the peripheral nerve and posterior column involvement clears up. In one case in a woman who was completely incapacitated, full mobility was restored within fourteen days: 25 microgrammes of vitamin B_{12} were injected parenterally and the same amount intramuscularly at the end of forty-eight hours, until a total of five doses was given.

On the fourth day of treatment she was able to walk unsupported. Subacute combined degeneration does not appear to be confined to pernicious anaemia, but has been observed in three patients with tropical sprue. [Details of the responses of the patients are given: some of the material appears to be similar to that discussed in previous papers—this *Bulletin*, 1949, v. 46, 391.]

P. Manson-Bahr

FAWDRY, A. L. **Report on Present State of Knowledge of Erythroblastic Anaemia in Cyprus.** *Cyprus Med. & San. Rep. 1946.* Appendix D, 12–16, 2 figs.

Most studies of Cooley's erythroblastic anaemia have been made in the U.S.A., Greece and Italy. Prior to the author's paper in 1944 [see this *Bulletin*, 1944, v. 41, 504], there were few references to this disease in Cyprus.

The author estimates that in Cyprus 1 in 1,000 of the total population, and 1 in 230 of the children under 10 years of age, have the disease. In a recent survey of 500 school children he found 17 per cent. with the "trait". The incidence was about equal in Greeks and Turks. The disease occurs three times more frequently in males than in females, but he found that the "trait" was more evenly distributed between the sexes—males to females 51 to 43.

There is no direct relation to any other disease, but the Wassermann test was "single-plus" in many cases in which there were no stigmata of syphilis. Malaria is now uncommon in Cyprus; this fact has made Cooley's anaemia stand out more prominently.

The age distribution in 42 cases is shown in a table. [These are presumably additional to those already reported by the author.] Twenty-four children were in the first year of life—6, 8, 5 and 5 in the four quarters; 1 to 2 years—8; 2 to 3 years—4; 3 to 4 years—2; and over 4 years—4.

In the number of cases which follow, the five classical signs were absent:—splenomegaly absent from 3 of 54 cases; hepatomegaly, 22 of 54 cases; adenopathy, 13 of 41 cases; systolic murmur, 5 of 39 cases; and the mongoloid face was absent from 20 of 52 cases.

Premature closure of the fontanelle, even at one year, was frequently noted.

The red cells in all cases showed an increased resistance to hypotonic saline. Nearly all cases of erythroblastic anaemia have a considerable proportion of their cells unhaemolysed at a concentration of 0·3 per cent. [usually referred to

by the author as 30 per cent]. This fact was used by the author as a rough test for the presence of the "trait". [Apparently he bases his percentage of 17 per cent. (*vide supra*) on this test.]

The author injected normal O-group blood into four patients with the disease. The survival time was "about 100 days which is the figure given for their survival in normal recipients". From this he concludes that the increased haemolysis is due to the abnormality of the cells.

Transfusion was the most promising treatment. This had to be repeated frequently. [See this *Bulletin*, 1947, v. 44, 344.] *L. E. Napier*

VENOMS AND ANTIVENENES

GOYAL, R. K. **An Investigation into the In-Vitro Titration of Cobra and Daboia Antivenins.** *Amer. J. Trop. Med.* 1948, Sept., v. 28, No. 5, 711–20.

The author reports the failure (except in the case of daboia antihaemolysin) of attempts to correlate various *in vitro* titrations of cobra and daboia antivenins with *in vivo* tests. He finds that the neurotoxic fraction of cobra venom is more important than the haemolysin, from which it can be separated by alkalinization of dilute venom. Titration of antivenin was attempted by observing the action of mixtures of neurotoxin plus antivenin on cultures of *Paramoecium caudatum*, and by certain other tests, including flocculation and complement fixation. No satisfactory correlation between *in vitro* and *in vivo* results was obtained, possibly because there is some interaction between the anti-haemolysin and antineurotoxin which interfered with the interaction of the neurotoxin with its corresponding antibodies.

The author's attempts to fractionate daboia venom failed. Fractions containing the haemolysin were isolated without difficulty, but there was no evidence of non-haemolytic toxic fractions. *In vitro* titration of daboia haemolysin (goat erythrocytes plus egg yolk) gave results roughly parallel to those of *in vivo* tests and the author suggests that such antihaemolysin titrations in the case of daboia antivenin might be used for preliminary tests before final *in vivo* titration is undertaken. *B. G. Maegraith*

WU, Y. K. & TSUI, Y. H. **Poisonous Snake Bite. A Report of Four Cases from the Chungking Area.** *Chinese Med. J.* Chengtu Edition. 1945, Apr., v. 63A, No. 3, 148–51.

Four cases of snake-bite are reported, but the snake inflicting the injury was identified in one of them only; it was *Trimeresurus mucrosquamatus cantor*. The symptoms in all four patients were very similar, both in character and in degree, and this is a common poisonous snake in Szechuan and parts of south-east Chiua, so it was probably the cause in others also. In spite of intense local pain—two of the patients were bitten on the foot, one on the leg and one on the hand—extensive swelling of the whole limb, oedema, ecchymosis and blister-formation around the site bitten, the systemic disturbance was remarkably slight. This is ascribed to the probability of the mildness of the venom of the snake in this district rather than to the amount of the venom injected being small. Antivenin, it is stated, "is generally not available in this country" and the treatment consisted of the application of tourniquets, one near above the bite and another higher up the limb, with loosening for 5 minutes at hourly intervals, and incisions and potassium permanganate locally. *H. Harold Scott*

KOSZALKA, M. F. **Multiple Bee Stings with Hemoglobinuria and Recovery : Report of a Case.** *Bull. U.S. Army Med. Dept.* 1949, Mar., v. 9, No. 3, 212–17. [Refs. in footnotes.]

"An unusual case of multiple bee stings of all exposed parts of the body, with severe edema, hemoglobinuria and subsequent recovery, is reported. The severity of the injuries and reaction might have been lessened had it been possible to extract the stings immediately after their deposition into the skin, since the sting apparatus when left in the skin continues to force out the contained venom by muscular action. The rapid recovery of this patient is attributed primarily to the parenteral use of calcium gluconate. Calcium salts apparently lessen the phenomenon of transudation, inhibit smooth muscle spasm, and neutralize the toxic effect of the bee venom. Its use, therefore, is suggested in the treatment of stings of bees and other insects where epinephrine has failed to effect a satisfactory response. The newer antihistaminic drugs, not available at the time, are also worthy of trial."

ROMAÑA, C. & ABALOS, J. W. *Latrodectus mactans*; su combate. [**Control of** *Latrodectus mactans*.] *An. Inst. Med. Regional.* Tucuman, Argentina. 1948, Dec., v. 2, No. 2, 153–61, 2 figs.

The English summary appended to the paper is as follows :—

"The authors refer to the domiciliary habits of *Latrodectus mactans*, in the Americas and Hawaii, and to the control by physical and biological means.

"They refer to their own experiences with different products, and arrive at the conclusion that 'Gammexane' is the most effective toxic for the fight against *Latrodectus*. For a successful control it is sufficient to treat houses and outdoor buildings, which are the places where accidents are more frequent."

DERMATOLOGY AND FUNGUS DISEASES

PIERS, F. **Sunlight and Skin Cancer in Kenya.** *Brit. J. Dermat. & Syph.* 1948, Oct., v. 60, No. 10, 319–32, 3 figs. [24 refs.]

In the author's opinion sunlight is a paramount factor in the causation of cutaneous cancer in Kenya. He distinguishes three types of cutaneous response to prolonged exposure to sunlight.

(1) *Permanent suntan*, the commonest reaction, results in thickening and coarsening of the skin ; permanent hyperaemia sometimes occurs and there is usually intensive pigmentation. The pigment is either diffuse or persists in the form of permanent freckles.

(2) *Farmer's skin*, in which the main characteristic is an accentuation of the normal skin folds, particularly at the back of the neck where a system of rhomboid furrows results, known as cutis rhomboidalis nuchae. Microscopically degeneration of the elastic and collagen fibres of the corium can be seen.

(3) *Chronic solar dermatitis*. This, the most advanced stage of chronic sunburn, results in thinning of the epidermis, patchy pigmentation, telangiectasis and abnormal keratinization indicated by persistent desquamation or the formation of keratoses.

Whereas diffuse changes, as in farmer's skin and permanent sun tan do not favour the development of cancers, the more proliferative localized lesions in chronic solar dermatitis are the immediate forerunners of malignant changes.

Since 1941 the author has seen 51 cases of cutaneous cancer among Europeans resident in Kenya. Of these 45 were basal celled and 6 were squamous-cell epitheliomata.

All the growths were on exposed parts. Twenty-seven patients gave a clear history of long occupational exposure to the sun; 10 others had undergone such exposure before settling in the colony, while in 14 patients there was no history of exposure.

In addition to these 51 cases, the records of the Medical Research Laboratory in Kenya showed a further 46 cases over the same period. These two figures added together would give an annual incidence of 60 cases of cutaneous cancer per 100,000 European residents in Kenya. *H. T. H. Wilson*

GHOSH, L. M. **An Analysis of 50,000 Skin Cases as seen in the Out-Patient Department of the School of Tropical Medicine, Calcutta, during the Five Years from 1942 to 1946.** *Indian Med. Gaz.* 1948, Nov., v. 83, No. 11, 493–501.

The substance of this article is compressed into two tables. The first of these consists of a list of 152 skin diseases arranged in alphabetical order. The diagnosis, total number of cases seen, and age and sex incidence are given. The main conditions encountered were scabies with 7,668 cases, ringworm of the body 6,299, impetigo 5,537, "allergic dermatitis" 4,731, seborrhoeic dermatitis 4,243 and leprosy 3,339 cases. Disorders of pigmentation were common and included 3,013 cases of leucoderma.

A second table includes 6,184 cases of filariasis and 8,413 more of leprosy, the figures being supplied by the filaria and leprosy research officers respectively.

In contrast to the distressingly high figure of cases of leprosy, only 6 cases of rodent ulcer were encountered. Ringworm of the scalp was comparatively rare, only 39 cases being seen, most of which were, in the author's opinion, imported. Psoriasis was not uncommon, and accounted for a total of 956 cases. *H. T. H. Wilson*

See also p. 519, KISSIN & ADLEMAN, **Transient Urticaria in Malaria.**

LURIE, H. I. **Benign Histoplasmosis. A Preliminary Report on the Results of Histoplasmin Skin Tests on Residents of the Union of South Africa.** *South African Med. J.* 1949, Mar. 5, v. 23, No. 10, 180–81. [10 refs.]

"1. A group of 140 white residents in the Union of South Africa were subjected to the histoplasmin skin test.

"2. Seventeen (12 per cent.) gave positive or doubtful reactions."

PRYOR, Helen B. **Histoplasmosis in California Children.** *J. Pediatrics.* 1949, Jan., v. 34, No. 1, 12–19, 5 figs. [15 refs.]

A brief sketch of the present state of knowledge of histoplasmosis is followed by the clinical records of 5 children in California, aged from 5½ to 11 years, who presented radiological evidence of multiple pulmonary calcification, and dermal sensitivity to histoplasmin but not to tuberculin or coccidioidin. Despite signs of active disease, such as cough, elevation of temperature, glandular enlargements and loss of weight, no attempt seems to have been made to place the diagnosis of histoplasmosis on a sure foundation by demonstrating the presence of *Histoplasma capsulatum* by culture or by microscopy; the diagnosis, in all five cases, rests on the discovery of multiple pulmonary calcifications associated with sensitivity to histoplasmin but not to tuberculin or coccidioidin.

In view of the great difficulty of establishing the mycological diagnosis in mild and convalescent cases of histoplasmosis, it may become expedient to follow the author's example but, in the meantime, the true significance of the histoplasmin reaction and multiple pulmonary calcifications in young children must be more clearly understood. *J. T. Duncan*

CARLOS RADICE, J. & NEGRONI, P. Coloración fluorescente mediante la primulina. Estudio histológico en diversas micosis. [**Fluorescent Staining by means of Primulin. Histological Study on different Mycoses.**] *Rev. Asoc. Med. Argentina.* 1948, Dec. 15–30, v. 62, Nos. 643/644, 731–3, 14 figs.

Fluorescence microscopy on sections of fungus-infected tissues stained by primulin and examined by filtered ultraviolet rays of approximately 3,650 Angstrom units from Wood's lamp, enables a closer study of the cell structure of the fungus than would be possible in the case of coloured sections illuminated by white light. The cell wall of *Coccidioides immitis*, *Paracoccidioides brasiliensis* and the "clubs" on colonies of Actinomycetes in tissue give a whitish fluorescence when examined in unstained sections under ultraviolet light. This is called primary fluorescence and it may be greatly intensified by staining the section with a fluorescent dye such as primulin, giving secondary fluorescence. Some foreign substances, such as paraffin wax, in the section may also give secondary fluorescence and it is important that all such substances should be removed before staining. To this end, paraffin embedded-sections are washed in xylene for 24 hours and then passed through a series of alcohol baths in descending strengths to remove the xylene and the last traces of paraffin. The sections are then washed in running water for 10 minutes to remove any formol which may be present, or for 30 minutes if picric acid or a metallic salt has been used as a fixative. This is followed by 15 minutes' immersion in a bath of 5 per cent. phosphomolybdic acid and then 2 minutes in 90 per cent. alcohol and 1 minute in running water. The sections are now transferred to a bath of 1 : 10,000 aqueous solution of primulin in which they should remain for 24 hours, and after this they are washed in tap water, dehydrated by alcohols and mounted in Canada balsam.

The authors do not mention the use of a quartz optical system in the microscopical examination, but satisfactory results can be obtained by means of the ordinary lenses of the microscope. Under ultraviolet light the outlines of the fungal cells stand out sharply against a dull background and the internal structure of such fungal cells as the spherule of *Coccidioides immitis* is rendered easily perceptible. Tissue nuclei and nuclear residues do not share in the fluorescence and an occasional source of misunderstanding is thus avoided.

The method was found useful in the cases of *Coccidioides immitis*, *Paracoccidioides brasiliensis*, and *Actinomyces* sp., but, apparently, not so useful with tissues from histoplasmosis, moniliasis and chromoblastomycosis.

A rapid method for treating frozen sections for this form of microscopy is also briefly described. *J. T. Duncan*

COUTELEN, F., COCHET, G. & BIGUET, J. Les céphalosporioses humaines. Revue critique à propos d'un cas. A la mémoire du Professeur Emile Bertin. [**Cephalosporioses of Man. A Case and a Critical Review.**] *Ann. Parasit. Humaine et Comparée.* 1948, v. 23, Nos. 5/6, 364–98, 7 figs. on 2 pls. [**Numerous refs.**]

In 1943 a study was made at the Saint-Sauveur hospital, Lille, of gummatous lesions in the cervico-facial region of a 69-year-old man from which it was concluded that the condition was of mycotic origin. A fungus isolated from

the pus and shown to be pathogenic for white mice, and a rat but not for guineapigs was identified as *Cephalosporium acremonium*. The disease responded to the administration of iodine (intramuscular injection of "Lipiodol") for three months supplemented by sulphonamide therapy during one week of the period.

As a background to this case (previously noted by COUTELEN & COCHET, *C.R. Soc. Biol.*, 1945, v. 129, 392, and here described in detail) the authors provide a comprehensive and useful survey of the association of species of *Cephalosporium* with pathological conditions in man. The published records are reviewed and tabulated under three heads: mycetomas and other deep-seated infections, superficial cutaneous infections, and infection of mucous membranes—and the geographical distribution is noted. Seventeen species of *Cephalosporium* and two of *Hyalopus* (probably a synonym of *Cephalosporium*) claimed to have been implicated in these conditions are listed. Most of these forms have been inadequately described and are of very doubtful status but *C. acremonium*, the type species of the genus, which has been isolated on a number of occasions merits recognition as a human pathogen.

G. C. Ainsworth

MISCELLANEOUS DISEASES

GORDON, J. E. & AUGUSTINE, D. L. **Tropical Environment and Communicable Disease.** *Amer. J. Med. Sci.* 1948, Sept., v. 216, No. 3, 343–57. [95 refs.]

The general purpose of this essay is to stress the idea that the proper study of disease in hot climates involves study of the host, the parasite (if there is one) and all the other features of the environment. The authors are concerned to show that small environmental variations determine the presence or absence of disease. Of the environmental factors, climate is perhaps the most important, since it not only exerts a direct effect on man, but it determines the biological environment which is so closely associated with the transmission of disease. But all the environmental factors react on each other, and the study of the whole environment is necessary, both for the individual patient and for people in the mass. The authors treat the subject on broad lines, and point out some of the gaps in our knowledge.

Charles Wilcocks

LEÓN, L. A. El clima y las enfermedades tropicales del altiplano ecuatoriano. [**Climate and Tropical Diseases of the Upper Levels of Ecuador.**] *Rev. Kuba Med. Trop. y Parasit.* 1949, Jan.–Feb., v. 5, Nos. 1/2, 4–8, 4 figs.

Ecuador, a small country on the Pacific Coast of South America, may, for descriptive purposes, be divided into three zones: Littoral, the inter-Andine region (upper levels), and the Eastern region. The second of these is the subject of this contribution. It is very mountainous, with interspersed valleys and, consequently, with varied temperatures and climate—torrid, temperate and cold. There are parts where the average temperature is from 7·6° to 20°C., and there may be daily variation up to 18°C.

The diseases of the country are divided by the author into 5 groups: (i) Those met with all over the area, notably smallpox, the enteric fevers, typhus, and infantile paralysis. (ii) Those endemic in the mountains—amoebiasis and helminthic infestations, pediculosis and mycotic skin affections. In this section only of the paper are there any figures of prevalence given. Of 1,745 school-children examined in the towns of Quito, Otavalo and Tulcán

24·29 per cent. were passing cysts or trophozoites of *E. histolytica*, as were 28·27 per cent. of 902 children in various rural schools. Among urban scholars ascariasis is the commonest helminthic infestation, 30·6 per cent., *Trichuris* in 6·5, *Hymenolepis* in 6·3 per cent. In rural school-children 69·8 per cent. had *Ascaris*, 38·5 *Trichuris*, 1 per cent. *Taenia* and 0·7 per cent. *Hymenolepis*. Common mycotic affections are by *Microsporon audouini*, *M. lanosum*, *M. album*, *Achorion schoenleini*, *Trichophyton gypseum*, *T. radiolatum*, *T. niveum* and *Pityriasis versicolor*. (iii) Diseases endemic or epidemic in the northern sector only. *Rabies* has been becoming more frequent since 1942, especially among the Indians who live in close contact with their dogs. *Plague* occurs in outbreaks, especially in the towns of Alausí, Riobamba and Ambato, often preceded by epizootics among hares and guineapigs (*Cavia aperea*). *Xenopsylla cheopis* is the chief vector, but *Pulex irritans* also transmits in mountainous districts. Other ectoparasites such as *Ceratophyllus londinensis* and *Leptopsylla musculi* on rats and mice, and *Rhopalopsylla cavicola* and *Hectopsylla suarezi* on guineapigs, it is said, play no part in plague transmission. (iv) Endemic diseases in the valleys are *bartonellosis*, *pinta* (in four foci, the valleys of Chillos, Yunguilla, Catamayo and Malacatos), *leprosy*, *malaria* with *A. pseudopunctipennis* as the chief vector, but *A. albimanus* is also present. A few cases of *balantidiosis* are seen. (v) Sporadic diseases. Cases have been reported of *bacillary dysentery*, *brucellosis*, *Weil's disease*, *filariasis*, *echinococcus*, *Dipylidium* infestation, intestinal *coccidiosis*, cervico-facial *actinomycosis* and *chromoblastomycosis*.

Other diseases are mentioned as occurring in other parts of Ecuador, but not in the district which is the subject of this paper. These are dengue, relapsing fever, Chagas's disease, yaws, hookworm and maduromycosis. [Unfortunately no figures of incidence are given except for the few mentioned in group ii.]

H. Harold Scott

GELFAND, M. **A Few of the Rarer Diseases seen in Africa.** *East African Med. J.* 1948, Dec., v. 25, No. 12, 447–53.

Onyalai is the African name given to a peculiar bleeding disease first described in Angola in 1904. It was reported in Southern Rhodesia, where it is common, by MORRIS in 1926 and later by BLACKIE [this *Bulletin*, 1938, v. 35, 74], who showed that the condition was associated with a marked thrombocytopenia. Gilkes in 1934 gave an accurate account of the disease in Northern Rhodesia [*ibid.*, 1934, v. 31, 751]. A number of workers (including Morris) have found that intramuscular injection of blood from any healthy adult stopped the bleeding, but blood transfusion may be necessary in severe cases. Vitamin K has been given with poor results.

The disease is usually found in an area extending from Broken Hill in the North to Angola in the West, to the eastern boundary of Southern Rhodesia (Nyasaland practically escaping) and southwards to the Transvaal and Bechuanaland. It has occasionally been reported as common in East and West Africa and the Congo. There is no evidence of any toxic factor in the diet or in remedies given by witch doctors or herbalists. The disease is most common in adult males, but is found at all ages and in females.

The characteristic lesion distinguishing onyalai from Werlhof's purpura (essential thrombocytopenia) appears to be the blood blister. The illness starts abruptly, the first symptom usually being bleeding from the mouth or nose, which may be mild or severe. Sooner or later bleeding occurs into the urinary tract, not uncommonly into the bowel, and in females into the vagina. Typically a blister varying from $\frac{1}{4}$ to $\frac{3}{4}$ of an inch in diameter is found anywhere on the mucosa of the lips, oral cavity, tongue or pharynx; such blisters are

black, and tend to rupture, leaving a painful ulcer. The ulcers are often multiple, the tongue enlarges and the parotids may swell ; in about a third of the cases the blisters occur on the legs, forearms, hands, and occasionally the trunk. Almost always purpuric spots are seen on the conjunctiva and sometimes on the skin.

The course is usually short, but there is always the risk of a relapse. Some cases are severe from the start and haemorrhage is serious, while in others who are apparently progressing favourably bleeding recurs with increased violence. The most serious type is probably that in which intracranial haemorrhage develops, the patient passing into coma with focal signs, and the fluid on lumbar puncture being blood-stained.

Primary splenic abscess was first described by WALLACE at Broken Hill in 1922 [this *Bulletin*, 1922, v. 19, 616], where there was an outbreak of some 40 cases in a comparatively short time. Although autopsies were performed in a number of cases no common aetiology was found and blood cultures from several patients were negative. Wallace concluded that the abscess was caused by a thrombosis of the splenic vein leading to a liquefactive necrosis of the organ which had become secondarily infected, probably with gas-producing organisms from the bowel. He found that a number of patients had a femoral thrombosis. A tympanitic splenic tumour was very suggestive of the condition. The condition is usually seen in young adults, starting abruptly with fever and pain in the left hypochondrium. The swelling rapidly enlarges upwards as well as downwards, raising the left dome of the diaphragm and encroaching on the lung. Dullness may be found at the left base, the signs then closely resembling pneumonia or empyema, while the heart may be rotated upwards and to the right ; this condition is best shown radiologically. A tympanitic note over a splenic tumour is very suspicious.

If such a condition is suspected, diagnostic aspiration should be performed at once. The pus is fluid, of a reddish colour, often frothy, and sterile on culture. Treatment so far has been by drainage, but a discharging sinus persists for many months. Removal of the spleen has not been attempted. There is insufficient evidence to incriminate amoebiasis : emetine has no effect.

This type of abscess is common in the Rhodesias, but so far as the author knows is not met with in East Africa.

Thrombophlebitis or *tropical phlebitis* has been recently reported in East Africa [this *Bulletin*, 1946, v. 43, 1186], but was first described in 1941 by FISHER in Northern Rhodesia [this *Bulletin*, 1942, v. 39, 199]. The onset is sudden, usually with high fever, shivering and headache. The duration of the fever, usually accompanied by a leucocytosis, varies from a few days to as long as ten weeks, and the patient in severe cases may be seriously ill and delirious. Pain in the affected vein, with oedema of the extremities, begins at the start and usually enables a diagnosis to be made. The peripheral veins usually attacked are the femoral—less frequently the subclavian, axillary and external jugular. When the lower limb is involved a permanent swelling of varying degree may persist, but emboli rarely occur.

The prognosis as regards life is good when superficial veins only are involved, but is usually grave when the larger internal ones (*e.g.*, the mesenteric, portal and cavernous sinus) are attacked. In cases of mesenteric occlusion passage of blood *per rectum* is an important sign, and the illness may closely simulate dysentery. Pain is usually severe. In thrombophlebitis, in which there is inflammation of the vein with secondary clot formation, oedema is characteristic, and it has been shown that this is due to an arterial spasm occurring simultaneously which disappears rapidly after lumbo-sympathetic block.

The author raises two points :—(1) Can primary splenic abscess be included in the same category as tropical phlebitis ? (2) Is there any relationship

between symmetrical gangrene of the extremities and tropical phlebitis? He doubts the latter, as tropical phlebitis is always unilateral to begin with.

Treatment is not discussed. [See also this *Bulletin*, 1948, v. 45, 545.]

C. F. Shelton

GELFAND, M. **Tropical Primary Phlebitis: Thrombophlebitis. With some Remarks on its Clinical Features and Treatment.** *South African Med. J.* 1949, Feb. 19, v. 23, No. 8, 129–32, 6 figs.

In this paper Gelfand carries the study of tropical thrombophlebitis a stage further by suggesting that in addition to the affection of the vein there is spasm of the corresponding artery, and that this is the cause of the oedema which is so striking a feature of the disease. He shows that in pure venous thrombosis there is little or no oedema, no tenderness, little or no fever, and a great liability to embolism. In thrombophlebitis such as has been described in Africans, on the other hand, there is primary inflammation of the vein, with pain, fever, oedema and little tendency to embolism.

On this assumption he has treated five cases (in which the femoral vein was affected) by injection of planocaine into the lumbar sympathetic ganglia of the side corresponding to the inflamed vessel, with the object of eliminating spasm. The results were good. The technique was as follows:—

"Ten c.c. of a 2·5% planocaine solution was injected 2 inches from the midline of the affected side towards each of the lower four lumbar vertebrae. A lumbar puncture needle was used. The needle was directed towards the body of each vertebra. On striking the bone, the needle was withdrawn slightly and carried forward into the tissues just beyond the vertebra."

The author thinks that some of the cases of gangrene which have been described in Africans may have been the result of a similar process of arterial spasm.

He records a case of thrombophlebitis of both external jugular veins, in which the oedema of the face resembled that produced by nephritis.

For references to other papers on tropical thrombophlebitis, see the abstract on an earlier paper by Gelfand, above.

Charles Wilcocks

DAVIES, J. N. P. **Pathology of Central African Natives. Mulago Hospital Post Mortem Studies. IX.** *East African Med. J.* 1948, Dec., v. 25, No. 12, 454–67. [26 refs.]

This paper in the series [this *Bulletin*, 1948, v. 45, 1118; 1949, v. 46, 90] deals with cardio-vascular conditions. Congestive heart failure was found 229 times in 3,705 autopsies, which is probably an underestimate. In 5 per cent. of these, no adequate cause was found.

Hypertensive renal disease accounted for 31 per cent. and aortic syphilis for 20·9 per cent., this being commonest between the ages of 30 and 40 (25 cases) and renal disease between 20 and 30 (23 cases). [In the absence of birth certificates in all cases the ages cannot be quite accurate.] In 2,994 autopsies, evidence of rheumatic carditis was found in only 22 cases, mitral stenosis being present in 21 of these. Subacute bacterial endocarditis was uncommon.

Acute bacterial endocarditis was common and found in 2·5 per cent. of all autopsies, the majority of cases arising from a primary septicaemia, the next common cause being pneumonia, and then a *Neisseria* infection. The most common single valve affected was the aortic (35 cases), while the aortic and mitral valves together were involved in 12 instances. In only 3 cases had the valves been previously damaged by rheumatism.

The only previous reference to the condition known as endocardial fibrosis is by BEDFORD and KONSTAM (*Brit. Heart J.*, 1946, v. 8, 236), who noted it in a number of West African soldiers dying of congestive heart failure. This condition is common at Mulago and typically the lesion consists of fibrosis of the endocardium, often extending deep into the myocardium. The coronary arteries appear normal. The aetiology is obscure, it is not of syphilitic origin and the fibrosis is not usually accompanied by cellular infiltration. These cases show a very chronic type of congestive heart failure, murmurs of valvular incompetence are found, and a pericardial effusion is often present. On opening the heart, which is usually dilated, it is found that the endocardium, especially at the apex of the left ventricle, is thick and pearly-white in colour, with strands of fibrous tissue going deep into the myocardium. The fibrosis extends up the ventricular walls and as a result the mitral valve is pulled down and distorted, but the aortic valve is rarely affected. Of the last 43 cases of congestive heart failure seen at autopsy, 8 have shown this lesion, these cases having formerly been grouped as syphilitic myocarditis on insufficient evidence. Myocarditis, endocardial necrosis, and endocardial fibrosis, are important in the pathology of the African but their aetiology is very obscure and they are not usually associated with any of the common cardiac diseases.

Cardiovascular syphilis has been previously dealt with in relation to the problem of syphilis in Uganda [this *Bulletin*, 1948, v. 45, 544]. Very little is known about congenital heart disease in Africans.

BECKER in South Africa found that arterio-sclerosis was the direct cause of death in 0·4 per cent. of autopsies. At Mulago, minor degrees of atheroma of the aorta were common, while in 38 cases out of 2,994 autopsies an advanced degree of this condition was found. Coronary thrombosis was rare in Africans, as was heart failure due to hyperthyroidism.

WILLIAMS [*ibid.*, 1942, v. 39, 417; *Bulletin of Hygiene*, 1945, v. 20, 260] concluded that hypertension, both " essential " and renal is common in Uganda but that chronic nephritis and urethral stricture accounted for the majority of cases of high blood pressure. At Kampala, hypertensive disease is the commonest cause of congestive heart failure, hypertrophy due to this condition being very frequent at autopsy. Renal conditions are fully discussed, and it is considered that nephritis and, less commonly, renal obstructive lesions are the commonest cause of hypertensive heart failure.

Miscellaneous cardio-vascular lesions, including periarteritis nodosa, Buerger's disease (thrombo-angeitis obliterans) have been found at autopsy, while peripheral gangrene, often symmetrical, is sometimes seen. Thrombophlebitis is not uncommon, but pulmonary embolism is rare. [Is this because the African usually refuses to stay quiet for long ?] Raynaud's syndrome and cardiac aneurysm have not been met with.

Purulent pericarditis has been described in a previous paper. Pericardial effusions are sometimes seen in cases of endocardial fibrosis. No case of rheumatic pericarditis was seen, nor of pericarditis associated with valvular lesions, and in no case with rheumatic valvular lesions was there evidence of past pericarditis. There were 45 instances of tuberculous pericarditis in 429 cases of tuberculosis and pericardial disease was found on 105 occasions in 2,994 autopsies.

The commonest valvular lesions seen at autopsy were—aortic valve, 206 cases (syphilitic 167, bacterial endocarditis 35) ; mitral valve, 35 (bacterial endocarditis 13, rheumatism 21).

Degenerative cardio-vascular lesions, atheroma. coronary thrombosis and primary hypertension appear less frequent in East than in South Africa, but it must be remembered that the majority of autopsies at Mulago are in patients under 40 years of age, and there is no evidence to suggest that in the older African

the incidence of degenerative changes is less than in the European. [The expectation of life is less in the former than the latter.] In the last two years, two conditions hitherto overlooked, viz., symmetrical gangrene of the extremities [GELFAND, this *Bulletin*, 1947, v. 44, 937] and endocardial fibrosis, have been described. *C. F. Shelton*

SOYSA, E. **The Eosinophilic Respiratory Syndrome. A Review of 100 Cases.** *J. Roy. Army Med. Corps.* 1949, Jan., v. 92, No. 1, 1–23, 11 figs. [39 refs.]

A three-stage clinical course was discernible in the majority of cases included in the investigation ; (1) the initial or prodromal stage appeared with malaise, feverishness, and anorexia progressing to febrile coryza accompanied by an occasional dry cough. This phase lasted from one week to a month. (2) The intermediate or bronchitic stage characterised by an increasingly persistent cough commonly described as irritating, hacking or dry. The duration of this stage varied from one month to three years. (3) The terminal or asthmatic was the most prominent clinical phase affecting all but three patients in the series. This stage varied in duration between the limits of one week and 13 years.

More than 50 per cent. of the skiagrams examined showed the characteristic shadows associated with this condition. The most constant and prominent pathological feature of this syndrome was its remarkable eosinophilic leucocytosis, counts ranging between 1,000 and 50,000 eosinophile per cmm. The severity of the symptoms was unrelated to the degree of eosinophilia, and sudden unexplained drops in the eosinophil count lasting from one to four days were occasionally noticed.

Sputum was examined for mites by the method described by CARTER *et al.* [this *Bulletin*, 1946, v. 43, 683]. Out of 67 cases examined mites were present in 42. Four genera were recognized, *Tarsonemus*, *Tyroglyphus*, *Glyciphagus* and *Carpoglyphus*. Various stages in the life-cycle were seen, male and female adults, hypopion forms, nymphs, larvae and ova. Eighty per cent. of the patients investigated lived in an environment which exposed them to the risk of inhaling airborne mites, and 56 of them worked in ration stores, cookhouses, bakeries, grocery shops, mills or warehouses. Sputum from a series of 44 controls was also examined for mites by the same technique. The control consisted of three groups, 13 persons suffering from respiratory disorders not associated with eosinophilia, 17 healthy persons employed in army stores, cookhouses, etc., and 14 healthy persons selected at random.

Treatment consisted of four to eight injections of arsenic in 12 cases, neoarsphenamine, tryparsonum, or acetylarsan being used once or twice weekly in doses graduated from 0·1 gm. to 0·5 gm. The other patients were given oral carbasone, leucarsone or stovarsol, one tablet twice daily. It was found that the decline in eosinophilia continued after cessation of treatment, and prolonged dosage was therefore unnecessary. *H. T. H. Wilson*

MONTESTRUC, E. Un traitement pratique de la pseudomyiase rampante. [**A Practical Treatment for Creeping Eruption.**] *Arch. Inst. Pasteur de la Martinique.* 1949, Jan., v. 2, No. 1, 24–6. [12 refs.]

The author, writing from Martinique, discusses the literature regarding the incidence and aetiology of creeping eruption and goes on to discuss its clinical manifestations. It is suggested that *Ancylostoma brasiliense* is the possible local cause. Many of the treatments tried for this refractory condition are mentioned. Ethyl chloride sprays are probably the most effective measures

yet known. In the absence of this substance in Martinique, a trial was made with ice. Ordinary small blocks of ice from the tray of a refrigerator were applied on and around the lesion, until all the ice had melted (about 10 minutes, usually). The itching ceased almost at once. A second application was made the same day; and on the next day the track, erythema and itching had all disappeared and have not recurred. This method has been confirmed with like success in several subsequent cases. Two applications daily for two days are claimed to be usually sufficient to clear the lesions completely. Such a treatment is obviously both simple and cheap. *H. J. O'D. Burke-Gaffney*

MÁRQUEZ, R. N. & VIVES, M. M. Apendicitis por parásitos. [**Appendicitis associated with Parasites**] *Prensa Méd. Argentina.* 1948, Nov. 19, v. 35, No. 47, 2252–3.

An account of two cases: in one, 12 *Enterobius* and in the other, 2 segments of *Taenia saginata* were found.

ENTOMOLOGY AND INSECTICIDES: GENERAL

DAKSHINAMURTY, S. **The Common House-Fly,** *Musca domestica*, **L., and its Behaviour to Temperature and Humidity.** *Bull. Entom. Res.* 1948, Dec., v. 39, Pt. 3, 339–57, 6 text figs. & 4 figs. on 1 pl. [38 refs.]

The housefly is concerned in the dissemination of a number of disease organisms but, although it is well established that its abundance and activity and the incidence of fly-borne diseases are dependent on climatic conditions, little is known of how these conditions affect the adult fly. The present paper is part of an extensive study of the factors controlling fly density; it is concerned with the responses of adult flies to gradients of temperature and humidity and to combinations of these two important environmental factors.

The experiments, which were carried out in a "choice chamber" modified from the type used by GUNN and KENNEDY (*J. Exper. Biol.*, 1936, v. 13, 450) and further developed by THOMSON [this *Bulletin*, 1938, v. 35, 913], were designed on a pattern permitting the results to be examined by an analysis of variance.

In addition to the experiments arranged to investigate *choice*, observations were made with the same apparatus on the *activity* of flies at four combinations of temperature and humidity.

The author first finds that the flies selected the lower of the two humidities in each of the following choices provided at 25°C.:—20–40 per cent.; 40–60 per cent.; 60–80 per cent. and 80–100 per cent. relative humidity (R.H.).

In arranging the apparatus for studying their responses to a choice of two temperatures the difficulty that a temperature gradient necessarily involves a humidity gradient is met in the following way: selection is made of a graded series of acid-water mixtures which provide, in one experiment, a constant R.H. value but a saturation deficiency (S.D.) gradient. In a parallel experiment the mixtures are selected so that a constant S.D. prevails throughout the chamber but the R.H. varies with the temperature gradient. Thus, for example, a constant R.H. of 65 per cent. in the gradient 20–30°C. results in saturation deficiences of 6 mm. and 11 mm. S.D. at the temperature extremes. Conversely, in this same temperature range a constant S.D. of 8 mm. provides an R.H. of 55 to 75 per cent. It will be observed that each temperature extreme is associated once with the drier air (*e.g.* 30°C. with 11 mm. S.D.) and, in the parallel experiment, once with the more moist air (*e.g.* 30°C. with 75 per cent.

R.H.). Similar conditions prevail for the other temperature choices investigated, namely, 30°C. or 40°C. and 27°C. or 33°C.

It is shown that flies, when given a choice of 20°C. or 30°C. and 30°C. or 40°C. chose 30°C. regardless of whether this temperature is coupled with the drier air or the more moist air.

The first demonstration—that at 25°C. flies selected the drier air in the four humidity ranges offered—is then confirmed at 25°C. and 35°C. (mean values of the two temperature ranges) in experiments in which the humidity ranges were limited to those investigated at 20–30°C. and 30–40°C. The choice was again for drier air.

An experiment is then made suppressing the temperature factor. A limited range of 27° to 33°C. is found to be suitable and humidity ranges are offered of 10·6 mm. to 15 mm. S.D. (R.H.=60 per cent. throughout the chamber) in one experiment and, in the parallel test, 50 to 60 per cent. R.H. (S.D.=13 mm. throughout the chamber). The flies chose again the drier atmosphere, namely, 15 mm. S.D. at 33°C. and 50 per cent. R.H. at 27°C. It is concluded that, provided there is not a temperature gradient great enough to induce a reaction to temperature, flies select the drier air. It appears from this type of result also that it is not possible to decide whether houseflies choose by the R.H. scale or the S.D. scale. This is the author's conclusion although (p. 350) he notes that there is a statistical indication that the choice of humidity is dependent on the S.D. scale.

These responses are next related to activity as observed in four separate experiments on flies at 35°C. and 18°C., each temperature being tested once in association with 20 and once with 90 per cent. R.H. Flies were found to be most active at 35°C. and 20 per cent. R.H. ; least active at 35°C. and 90 per cent. R.H. ; intermediate, and similar, in activity at 18°C. and each of the humidities. That is, at the low temperature, humidity had no effect on the flies' activity, but at a high temperature activity occurred particularly in the dry air and was slight in the sub-satured air.

In an interpretation of these results it is suggested that flies, since they select dry air, must have an efficient spiracle-closing mechanism and be able to absorb water from their faeces before its passage. It is known, the author points out, that metabolic rate is a function of temperature and that higher temperatures involve an increase in the metabolic rate with need for loss of excess metabolic water. In dry air this is assured because the increased respiration rate of the fly provides facility for evaporation of water in the tracheal tubes through the open spiracles ; this physiological mechanism assists, it is supposed, in keeping the body below the environmental temperature. In a highly humid atmosphere at high temperatures this cooling effect cannot take place since the evaporative power of the air is inadequate. A fly might therefore die in these circumstances owing to the direct effect of temperature, and certainly can become inactive (*e.g.* at 35°C. and 90 per cent. R.H.). In dry air at high temperature (*e.g.* 40°C.) there is, however, risk of desiccation and the fly therefore prefers air at a lower temperature (*e.g.* 30°C.) at which an adequate metabolic rate and activity can still be maintained and at which, even if more moist than the air at 40°C., loss of metabolic water is still possible. Cooling of the body can therefore still occur and the risk of desiccation is less. At low temperatures (18° or 20°C.) the metabolic rate is reduced correspondingly and with the lower respiration rate there is only limited opportunity for loss of water through the spiracles. Consequently, flies at lower temperatures are only moderately active and, furthermore, humidity can play little part in affecting this activity. Flies, therefore, go towards the higher temperature of 30°C. where the metabolic rate and activity are increased. They would prefer a drier air but will again tolerate a

more moist air than at the lower temperature provided this is consistent, as it is at least at 75 per cent. R.H., with the need to get rid of the excess metabolic water. In circumstances where this is not possible a dropsical condition is presumed to develop.

These interpretations are related to general observations on fly activity and density in the field. Hot, dry conditions such as occur usually from 2 to 4 p.m. daily are associated with maximal fly activity. The tendencies of flies to be outdoor insects on hot, sunny days and to come indoors in rain are considered to be a choice of the warmer and drier atmosphere. In temperate climates flies are most abundant sometime during the summer and this is a temperature effect, but in the tropics differences of humidity, related to rainfall incidence, are more important than temperature which is generally suitable for flies at all times of the year. Examples are cited of flies being numerous and active in hot, dry inland areas (*e.g.* Delhi) but fewer and less troublesome in warm humid coastal cities (*e.g.* Madras, Calcutta, Bombay) or in the humid climate of Malaya. In the first case, activity and abundance are associated with high temperature and low humidity. In the humid regions, although the temperatures are suited to activity, the humidity is too high ; the flies' activity is limited, its reproductive potential lowered, and its numbers, therefore, are less.

These observations are made with due regard to the coincidental but important effects of climatic conditions on other aspects of the flies' bionomics.

D. S. Bertram

TWINN, C. R., HOCKING, B., MCDUFFIE, W. C. & CROSS, H. F. **A Preliminary Account of the Biting Flies at Churchill, Manitoba.** *Canadian J. Res.* Sect. D. Zool. Sci. 1948, Dec., v. 26, No. 6, 334–57, 14 figs. [16 refs.]

At the request of Canadian and of United States Government Departments the authors carried out a survey of the biting flies in the neighbourhood of Churchill, Manitoba, with a view to devising control measures. The survey covers the period May 16th to August 10th, 1947.

Churchill, in the subarctic region, lies at the mouth of the Churchill River on the west shore of Hudson Bay. The terrain is varied and the following types of country occur : spruce-larch forest, shrubby willow-birch associations, tundra and tundra meadow extending to the tidal flats and sand dunes of the Hudson Bay shore.

The snows melt about May and innumerable pools and much marshy ground persist throughout the spring and summer ; the river is free of ice about mid-June. The average monthly figures for climate in May, June, July and August were respectively : temperature, 24·5°F., 44·8°F., 58·3°F. and 54·3°F. ; relative humidity, 91·5 per cent. in May and 84 per cent. from June to August ; windspeeds—11 to 14 m.p.h. ; rainfall—0·18, 0·91, 0·95 and 2·9 inches ; cloudy conditions prevailed for about half the time.

Mosquitoes.—No anophelines are recorded. *Aëdes nigripes, A. punctor, A. nearcticus, A. communis, A. campestris, A. excrucians, A. flavescens* and *A. cinereus* occurred in that order in abundance, breeding in the various pools and marshy ground. All overwinter in the egg stage. Adult emergence is at a peak about the end of June ; biting activity is maximal about mid-July but, by early August, mosquitoes are appreciably less in number. Biting occurred chiefly from sunset to sunrise, but forest species would bite in the day time. Females of several species have been found carrying the adhesive pollinia of orchids (*Habenaria obtusata*) on their heads ; it is suggested that the mosquitoes in feeding on the nectar of orchids effect pollination. *Culiseta alaskaensis* and *C. impatiens* were few in number. Details are given under species of breeding places and habits of all ten species.

Simuliids.—The following species are recorded :—*Simulium venustum, S. vittatum, S. ottawaense, S. arcticum, S. perissum* and *Eusimulium baffinense palens, E. latipes* and *E. aureum* together with four possibly new to science. *S. venustum* is the most important blackfly pest of man, breeding in ditches, drains and rivers. It is thought to overwinter in the egg stage at Churchill. Adults are very numerous by mid-July. Eggs, larvae and pupae occur into August, there being probably three generations each summer. Detailed notes are also given for *S. vittatum, E. latipes, E. aureum* and the new (unnamed and undescribed) species.

Tabanids.—Collections were made incidentally to other work. No males or immature stages were taken. The following species were found :—*Hybomitra affinis, H. septentrionalis, H. metabola, H. zonalis, H. hearlei* and *H. gracilipalpis* ; *Chrysops carbonaria, C. furcata, C. nigripes* and *C. frigida.* The first two species of each genus were the most abundant, occurring from early or mid-July into August, and with *Chrysops* appearing to bite man more readily. *Chrysops* was seldom taken outside woodland. *H. affinis* was attracted in large numbers to vehicles, including trains and track vehicles, settling on a standing vehicle rather than on a nearby person. It seemed that the warmth of the vehicle, which had just halted in the instances observed, was the attractant ; movement stimulated pursuit. Tabanids were biting in daylight, preferably in the sun, and only above 55°F. Although often in buildings they did not bite indoors.

Suitable clothing and " a good standard repellent such as DMP " provided good protection against tabanids. Accounts of control and protective methods against these biting fly pests are to be published elsewhere. *D. S. Bertram*

BOHART, R. M. **A Synopsis of the Philippine Mosquitoes.** *Navmed* No. 580, [1+]88 pp., 10 pls. [33 refs.] multigraph. [Washington, D.C.] Dep. Navy, Bur. Med. Surg. [1945.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, Jan., v. 37, Pt. 1, 10.]

This paper contains keys to the mosquitos found in the Philippine Islands, together with notes on the morphology and distribution of most of them, the synonymy of some and the breeding place where known. Tables are included showing the Philippine species of *Anopheles* that have been incriminated as natural or experimental vectors of malaria.

MARKS, Elizabeth N. **Studies of Queensland Mosquitoes. Part III. The *Aëdes* (*Finlaya*) *australiensis* Group.** *Univ. of Queensland Papers. Dept. of Biology.* 1948, Aug. 16, v. 2, No. 8, 42 pp., 17 figs.

BOHART, R. M. **A Key to the Chinese Culicine Mosquitoes.** *Navmed* No. 961, 23 pp., [19 refs.], multigraph. Washington, D.C., Navy Dep., Bur. Med. Surg., 1946. [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, Feb., v. 37, Pt. 2, 27–8.]

Keys are given to the adults and larvae where known of the mosquitos that occur in China, excluding Anophelines. Very brief notes are included on their distribution within and outside China, together with indications of the species that are natural or experimental vectors of disease in China or elsewhere.

BEQUAERT, J. *Aëdes aegypti* **(Linnaeus), the Yellow Fever Mosquito, in Arizona (Diptera).** *Bull. Brooklyn Entom. Soc.* 1947, v. 41, No. 5, 157. [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, Feb., v. 37, Pt. 2, 22.]

In a recent monograph, *Aëdes aegypti*, L., was not recorded from Colorado, Utah, Arizona or California. However, J. R. de la Torre-Bueno recently sent the author a male caught in his house at Tucson, Arizona, in October 1946, and stated that the species is well known in that locality, where it is fairly common in summer and often annoying indoors through its attacks on the ankles. It often bites during the day. If temperature conditions are favourable, breeding continues during the winter.

CAMAIN, R. & ABONNENC, E. Sur la myiase à *Dermatobia cyaniventris* en Guyane Française. Rôle vecteur de *Aëdes taeniorhynchus* (Wiedeman, 1821). [**Myiasis due to** *Dermatobia cyaniventris* **in French Guiana. Vector Rôle of** *Aëdes taeniorhynchus.*] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 175.* 1948, July, 3 pp., 1 pl.

KIRK, R. & LEWIS, D. J. **Taxonomy of the Ethiopian Sandflies** (*Phlebotomus*). **III. New Species and Records : Alterations and Additions to the Keys.** *Ann. Trop. Med. & Parasit.* 1948, Dec., v. 42, Nos. 3/4, 322–33, 17 figs. [11 refs.]

ABONNENC, E. Phlébotomes de la Guyane Française (XXV). Sur *P. ayrozai* Barretto et Coutinho, 1940 et *P. paraensis* Costa Lima 1941. [**The** *Phlebotomus* **of French Guiana (XXV),** *P. ayrozai* **Barretto and Coutinho, 1940 and** *P. paraensis* **Costa Lima 1941.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 177.* 1948, Aug., 4 pp., 2 figs.

FLOCH, H. & ABONNENC, E. Phlébotomes du Vénézuela (II). Description de *P. atroclavatus* Knab, 1913, de *P. evansi* Nunez-Tovar, 1924, de *P. cayennensis* Floch et Abonnenc, 1941, de *P. baduelensis* Floch et Abonnenc, 1941, de *P. punctigeniculatus* Floch et Abonnenc 1944, de *P. venezuelensis* n. sp. et de *P. zuliaensis* n. sp. [**The** *Phlebotomus* **of Venezuela (II). Descriptions of** *P. atroclavatus, P. evansi, P. cayennensis, P. baduelensis, P. punctigeniculatus, P. venezuelensis,* **n. sp. and** *P. zuliaensis,* **n. sp.**] *Institut Pasteur de la Guyane et du Territoire de l'Inini. Publication No. 178.* 1948, Aug., 24 pp., 12 figs. [11 refs.]

FAIRCHILD, G. B. & HERTIG, M. **An Improved Method for Mounting Small Insects.** *Science.* 1948, July 2, 20–21.

The following method of mounting specimens of *Phlebotomus* is used by the authors and found to be more satisfactory than many others they have tried.

The head, thorax and abdomen are separated and briefly boiled, in 10 to 20 per cent. KOH. Alternatively, the insect may be gently warmed or else left for some hours in cold KOH. (The wings are not treated with KOH, but are put straight into the stain.) The specimen is next rinsed in water, and then stained with acid fuchsin in phenol for twenty minutes. After staining, it is rinsed in phenol and mounted on a cover slip in separate drops of phenol copal, or canada balsam dissolved in pure phenol, and left overnight.

In the morning the cover slip is turned over on to a large drop of phenol copal on a slide. The cover slip should be supported at the corners by chips of cover slip glass to avoid crushing of the specimen. The preparation should now be dried in gentle heat.

In making preparations of the abdomens of female *Phlebotomus*, the change from pure phenol to the mounting medium should be made in gradual stages.

It is pointed out that the spermathecae are best seen either in phenol or in water after the KOH treatment, and drawings should be made at this stage, as even with most careful mounting it is not always possible to avoid distortion.

H. S. Leeson

BRISOU. La prophylaxie moderne des maladies transmises par les insectes. [**Modern Prevention of Insect-borne Diseases.**] *Rev. Méd. Nav.* (*Métropole et Outre-Mer*). Paris. 1948, v. 3, No. 4, 347–63.

A general review and discussion.

BISHOPP, F. C. **The Medical and Public Health Importance of the Insecticide DDT. Hermann M. Biggs Memorial Lecture.** *Bull. New York Acad. Med.* 1945, Nov., v. 21, No. 11, 561–80. [22 refs.]

FAY, R. W., BUCKNER, A. J. & SIMMONS, S. W. **Laboratory Evaluation of DDT Residual Effectiveness against House Flies,** *Musca domestica. Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 877–87, 6 figs.

The residual effectiveness of DDT was tested by exposing three-day-old adult houseflies to treated panels forming the walls of a chamber.

Normal ageing of panels with DDT deposits did not reduce the toxicity, but panels exposed to insects at frequent intervals showed a marked decrease in toxicity over periods up to 52 days. The theory that this decrease in toxicity might be due to a mechanical removal of DDT by flies was tested by making a quantitative chemical analysis at the beginning and at the end of the experiment. Although the mortality of flies was reduced from 75 per cent. to 0 per cent. over four months, the quantity of DDT was reduced only from 200 mgm./sq. ft. to 158 mgm./sq. ft.

Male houseflies were shown to be less resistant to DDT residues than female flies and since the ratio of the sexes varies considerably in different localities this difference is important in a field evaluation of DDT residual effectiveness.

DDT was found to penetrate a roughwood surface more readily than plywood or wallpaper. Owing to the loss of toxic residues accompanying absorption of DDT into a surface, a 2½ per cent. DDT emulsion is normally used instead of a smaller volume of 5 per cent. DDT. Experiments in which 2½, 5 and 10 per cent. DDT is used to give deposits of 200 mgm./sq. ft. in each case, on the three types of surface showed that 2½ per cent. DDT was more effective than other concentrations on wallpaper and roughwood, but that there was no significant difference on plywood. The residual effectiveness was much better on roughwood than on the other two surfaces.

Panels treated with a DDT emulsion and others with a DDT water-wettable suspension were exposed to sun, or rain, or to sun and rain. The emulsion residues were not affected, but the water-wettable suspensions deteriorated after five weeks' exposure to sun and rain, and after twelve weeks' exposure to rain alone.

C. M. Harrison

LINDQUIST, A. W., KNIPLING, E. F., JONES, H. A. & LAAKE, E. W. **Blow Fly Control with DDT Sprays dispersed from Aircraft.** *J. Econom. Entom.* 1948, Dec., v. 41, No. 6, 971–3.

ROMAÑA, C. & ABALOS, J. W. "Control" larvario de simulidos y culicidos con "Gammexane" y DDT. [**Larval Control of** *Simulium* **and Mosquitoes with Gammexane and DDT.**] *An. Inst. Med. Regional.* Tucuman, Argentina. 1948, Dec., v. 2, No. 2, 107–46, 9 figs. English summary.

The authors describe the survey and treatment of twenty-one streams, which was carried out by one man, in a zone having an area of 75 sq. km. in

Argentina. The insecticides used were crystallized DDT dissolved in kerosene at the rate of 50 gm. insecticide per litre of solvent, and Gammexane (benzene hexachloride—BHC) in wettable mixtures.

The minimum dose of Gammexane necessary for the elimination of *Simulium* is given as 700–1,000 mgm. per litre of water. A detailed account and tables are given of the observations and treatments of streams over one year.

Previously treatment against *Anopheles*, *Culex* and *Simulium* in this area involved the clearing of vegetation along the streams, and treatment with petroleum. This was efficient against *Anopheles* but not against *Simulium*. Moreover, treatment with BHC requires less labour and thereby is 85 per cent. cheaper than the other method. Although treatment with DDT and BHC is simple and efficient it is practicable only when streams are of small or medium size.

It was observed that BHC also killed crustaceans and snails which are intermediate hosts in the life cycle of certain helminths. *C. M. Harrison*

MAIER, J., RENDTORFF, R. C. & SUÁREZ, M. **The Duration of Residual Effect of DDT Sprays on Building Materials used in Rural Venezuela.** *Amer. J. Trop. Med.* 1948, Nov., v. 28, No. 6, 889–94.

Three types of spray were tested :—

(1) 5 per cent. suspension in water of DDT 50 per cent. wettable powder.
(2) Emulsion in water of xylene-Triton X-100 DDT concentrate.
(3) 2·5 per cent. solution of technical grade DDT in refined kerosene.

Blocks of five common types of building materials were sprayed at 1 gm./sq. metre (approx. 100 mgm./sq. ft.) : blocks of *adobe* (sun-dried mud) ; *bahareque* (sun-dried mud mixed with straw) ; *encalado* (adobe with a coating of lime and water) ; *gamelote* (thatching of coarse flat-leaved grass) ; and *paja de cerro* (thatching of fine round-leaved grass).

Wild engorged female mosquitoes were exposed to these blocks at monthly intervals, for periods of fifteen minutes and four hours.

After fifteen-minute exposures, the aqueous suspension of DDT gave 100 per cent. mortality on all wall materials in the first month, and continued to do so on *encalado* up to the fourth month, but on *adobe* and *bahareque* gave only 40 per cent. and 45 per cent. mortalities respectively, after three months. The emulsion and the solution were found to be less effective than the suspension, although on *adobe* their effectiveness increased over the first three months. In the tests on roofing materials, the suspension and emulsion gave approximately similar results but the DDT solution gave much lower mortalities.

Differences between the three types of spray, evident in the fifteen-minute exposure tests, were not borne out by mortality counts of mosquitoes after four-hour exposures. Mortalities of 72–100 per cent. were obtained on materials sprayed nine months previously and *encalado* gave a 100 per cent. mortality after ten months.

The authors point out that under natural conditions, mosquitoes are not likely to remain in contact with a treated surface for a period of four hours and that the results of the fifteen-minute exposures probably give a more accurate picture of the practical effect of spraying houses. *C. M. Harrison*

SARLES, M. P., DOVE, W. E. & MOORE, D. H. **Acute Toxicity and Irritation Tests on Animals with the New Insecticide, Piperonyl Butoxide.** *Amer. J. Trop. Med.* 1949, Jan., v. 29, No. 1, 151–66.

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

VAN DEN BERGHE, L. Un nouvel Institut Belge pour la recherche scientifique en Afrique centrale. [**A New Belgian Institute for Scientific Research in Central Africa.**] *Acta Tropica.* Basle. 1949, v. 6, No. 1, 51–2.

In July 1947, the *Institut pour le Recherche Scientifique en Afrique Centrale* (I.R.S.A.C.) was established in Léopoldville. The object of the Institute is the fundamental study of tropical conditions from the human, zoological and botanical aspects. For this purpose, the Belgian Congo is particularly well suited, because of its varying altitudes and dense network of communications.

In 1949 and 1950, several research centres will be erected in the Congo and in Ruandi-Urundi, where Belgian and other scientists will have facilities for pursuing their researches. These will include centres for experimental biology, anthropology, climatology, botany and nutrition.

The Institute will have its own scientific staff and equipment and will serve to co-ordinate and extend the work of the different scientific institutions in the Congo. It will also serve as an information bureau and organization service for visiting scientists. It is claimed that the library to be established at the main centre will probably be the largest in Central Africa.

The I.R.S.A.C. will not produce a periodical of its own, but its annual scientific reports will contain extracts from notes or publications by its members : these annual reports will be widely distributed throughout the scientific institutions of the world.

The Institute is administered, under Government sponsorship, by an Administrative Council, consisting of representatives of different branches of science. It is noted that, in addition to leading Belgian scientists, the Council includes three eminent foreigners, namely Dr. E. B. Worthington (Scientific Adviser to the East African High Commission, Nairobi), Professor M. A. Chevalier (of the National Natural History Museum of Paris), and Dr. Harlow Shapley (Director of Harvard College Observatory).

The Director of the Institute, who is already in the Belgian Congo, is Professor Louis van den Berghe, of the Tropical Medicine Institute in Antwerp and Tulane University. *H. J. O'D. Burke-Gaffney*

GREAVES, F. C. **The Health Services Program in the Trust Territory of the Pacific Islands.** *U.S. Nav. Med. Bull.* 1948, Nov.–Dec., v. 48, No. 6, 925–40, 7 figs. (1 map).

The Pacific islands to which the author refers are those of the former Japanese Mandated Islands of Micronesia ; they include 2,133 islands, atolls and reefs in the Marshall, Caroline and Marianas Groups. There are about 50,000 inhabitants, who live in about 120 isolated island communities. Before contact was established with foreigners there were about three times as many people, but a century and a half of contact has meant epidemics of typhoid fever, smallpox, measles and other diseases, which displayed the severity commonly recorded in unsalted populations. At present there is little accurate information as to the prevalent diseases, though there is reason to believe that tuberculosis is widespread and intestinal parasitism almost universal ; leprosy and venereal diseases also exist, and there is a form of encephalitis due to an unidentified virus, which would repay study.

In these islands there are civil administration dispensaries, with 325 beds and 18 medical officers, but the Guam Memorial Hospital of 300 beds can also be used, though Guam is not administratively part of these island groups. The American authorities have equipped a survey ship, which carries two medical officers, a dental officer, a public health official and their staff and equipment

(including a photofluorographic unit). This vessel travels from island to island, all the inhabitants are examined and an assessment of the sanitary conditions is made. Eventually a considerable body of exact information will be available, on which the structure of a health service can be based.

The training of the local people for health duties is promoted, and there are three schools, for medicine, dentistry and nursing respectively, at which the courses last 4 years. The people are lively and intelligent, and are " quick to accept the elements of civilization that benefit them, interest them, or amuse them ".

The American authorities [presumably the naval authorities] have interpreted the Trusteeship Agreement literally, and have proceeded upon a course of action based upon accepted American standards. That is, they do not propose to leave the people undisturbed, and to take only such health action as would be necessary to protect the American administrators, but rather to train the people to the adoption of American standards. Progress is being made in cleanliness of villages, safety of food and water supplies, sanitation, etc.

[It will be interesting to see the reports of the medical survey, when these are published. Before the war there was little information about these islands.]

Charles Wilcocks

HARDING, R. D. **A Note on some Vital Statistics of a Primitive Peasant Community in Sierra Leone.** *Population Studies.* 1948, Dec., v. 2, No. 3, 373–6.

This paper records the results of thorough and repeated examination of all persons in a community originally numbering 1,406, living in primitive conditions in Sierra Leone ; the examinations which were made in the course of an investigation into the manifestations of untreated yaws, were repeated every two months for a year. The accuracy of the figures obtained is high, for almost the whole work was done by the author and his wife, who soon knew the individual persons by sight, and who usually succeeded in tracing absentees. Reports of death were cross-checked as far as possible, and are regarded as fairly accurate.

Among the 1,406 persons there were 29·3 per cent. of men (over 15 years) 36·2 of women (over 13), 18·6 of boys and 16·0 of girls ; this distribution corresponds with that of other communities in rural Sierra Leone. There were dispensaries within 15 miles of all the people, but they were used mainly for trivial complaints, and there was, therefore, little chance that medical interference had greatly influenced the statistics obtained, except that the death-rate from sleeping sickness had been reduced. The annual birth rate was 32·9 per 1,000 ($\pm$3·27) ; the miscarriage and still-birth rate 22·9 per 100 live births ; the death rate 38·4 per 1,000 ($\pm$3·52) (there were no major epidemics) ; and the infant mortality rate was 417 ($\pm$48) per 1,000 live births.

Of the total deaths (56) almost half were in children aged 3 years or less (26) ; of these 26, 10 were attributed by the relatives to acute fever, probably malaria in most cases. An acute diarrhoeal disease, probably bacillary dysentery, caused 9 deaths. These figures may be compared with others previously recorded by the author [in a paper reviewed in this *Bulletin*, 1940, v. 37, 697].

Harding makes the point that reasonably accurate vital statistics are necessary before satisfactory health plans can be made, and suggests that small investigations such as he has made should be undertaken as often as possible ; together, they would create a reliable body of evidence. [This is, of course, very sound ; it seems likely that missionary communities, which are relatively stable, would be able to contribute most useful information if they set out to obtain it.]

Charles Wilcocks

WEST, J. B. **United States Health Missions in Liberia.** *Pub. Health Rep.* Wash. 1948, Oct. 15, v. 63, No. 42, 1351–64.

This review relates to a period of 3 years, from November 1944, during which the Missions were at work in Liberia. The first duties were to ensure the good health of the American forces. The author gives some account of the medical services of the country and of the common diseases.

There were two hospitals at Monrovia, with 60 beds in all, not well equipped. The Firestone Plantations Company maintained a modern hospital of 100 beds near Roberts Field. There were 6 physicians and 2 dentists in Liberia, for a population of 2 millions.

The chief diseases are malaria, helminth infections, venereal diseases, and trypanosomiasis. The author makes the remarkable statement that "98·6 per cent. of the mosquitoes aspirated from inhabited areas [of Monrovia, Kahata and Roberts Field] were *A. gambiae*", the remaining 1·4 per cent. including other anophelines, *Culex fatigans* and *Aëdes aegypti*. He describes the control measures adopted, which consisted largely of DDT residual spray and DDT in oil as a larvicide. In the three years there has been a great decrease in the number of cases of malaria treated in hospital. Chloroquine was available. The measures taken to cope with intestinal and venereal diseases are also described.

[The report is a small addition to our knowledge of the health situation in Liberia, but it is only a sketch.] *Charles Wilcocks*

POINDEXTER, H. A. **Experimental Animal Colony in Tropical West Africa.** *Pub. Health Rep.* Wash. 1949, Jan. 14, v. 64, No. 2, 57–62.

An account is given of an attempt to found a small laboratory animal breeding unit in tropical West Africa. The area chosen for the project was Monrovia in Liberia, at sea level.

The animals with which the colony was commenced came from the National Institute of Health Laboratories, Bethesda, Maryland, and consisted of 9 white rabbits, 16 guineapigs, 12 white rats and 18 white mice ; the exact proportions of the sexes are not given.

On arrival of the animals at Monrovia, they were accommodated in cages in a well-built and well-ventilated animal house. Apparently there were accommodated in the same animal colony, local fauna of all sorts, including dogs, cats, wild rats, shrews, chickens, canaries, reptiles, frogs, fishes and others and all were fed on local products.

The resulting "tragedy" of an outbreak of *Salmonella typhi-murium* infection, to say nothing of the lesser ills described, should surely have caused no surprise under these conditions !

The next tragedy was cannibalism among the mice, guineapigs and rabbits. Apart from these positive deterrents to multiplication, the rabbits and guineapigs refused to breed, although they appeared healthy. The possible causes of this sterility are discussed without much light being thrown on the subject.

As a last resort, a few rabbits and guineapigs were transferred to Ganta, which is at an elevation of 1,200 feet. The food given here was similar to that given at Monrovia, with the addition of elephant grass.

In the case of both rabbits and guineapigs, the breeding results were highly successful in this new location. New rats imported from the United States bred well at Monrovia as did the white mice originally imported.

From the general account of these breeding operations, it is evident that at least some of the trials and tribulations encountered were due to inexperience and could have been avoided by the application of knowledge already possessed

by others long experienced in the care of laboratory animals in the tropics. In the discussion (8 lines) it is stated that "cross breeding of the temperate zone experimental animals with native stocks seems to be indicated." [There is nothing in the account to show how this conclusion, even if correct, is arrived at unless the addition of two female and one male rabbit obtained in Liberia and sent to Ganta, supplies the evidence for this generalization.]

H. E. Shortt

COONOOR. **The Pasteur Institute of Southern India, Coonoor. Annual Report of the Director, together with the Forty-First Annual Report of the Central Committee of the Pasteur Institute Association 1947-48.** 48 pp., 1 chart. 1948. Madras: Diocesan Press.

This report follows on the same lines as that for 1946–47 [this *Bulletin*, 1948, v. 45, 657].

During the year, 18,551 patients received the Institute's anti-rabic vaccine either at the Institute or its Subsidiary Treatment Centres. At the former, 323 patients received a complete course and 61 received incomplete courses of treatment. There was one death, At the subsidiary centres, 13,930 patients were treated (8,799 complete courses). There were 11 deaths among these: all occurred among Asiatic patients who had been exposed to dog bites. In Madras and neighbouring states, 1,324 animals were also treated and these included 855 dogs. Detailed statistics relating to rabies are shown in 10 tables.

The research work in the Institute and the Nutrition Research Laboratories includes a number of studies already noted in this *Bulletin* and the *Bulletin of Hygiene*. These investigations included work on rabies virus and vaccines; growth requirements of *V. cholerae* in media; and tropical eosinophilia in experimental animals. Work was also done on the vitamin B complex, vitamins A and D, hydrogenated oils, erythrocyte phosphatase, metabolic disorders of the liver and experimental lathyrism.

A Nutrition Clinic was established in 1947 and 219 cases of nutritional disorder were examined during the year: they are classified in a table in the text.

In the Southern India Branch of the Malaria Institute of India, *Plasmodium gallinaceum* and insect vectors were maintained. Attempts to preserve *P. gallinaceum* by drying infected blood *in vacuo* were unsuccessful so far as infection experiments were concerned, as the dried blood could not be re-dissolved in saline or fresh serum: the parasites appeared, however, to retain their morphological structure.

Experiments are in progress towards infecting partially incubated chick-embryos through the chorio-allantoic membrane with varying quantities of blood from a fowl acutely infected with *P. gallinaceum*. Studies on the bionomics of *A. fluviatilis* were completed.

H. J. O'D. Burke-Gaffney

STRAHAN, J. H. **Reflections on the Course of Preventive Medicine in Malaya.** *Med. J. Malaya.* 1948, June, v. 2, No. 4, 221–38.

This presidential address delivered at the Annual Meeting of the Malaya Branch of the British Medical Association deals with the history of the impact of western medicine on Malaya. In the early years curative medicine monopolized attention. A Port Quarantine Service was established in 1900 but serious attention to preventive medicine had to wait till 1911 when the Health Service of the then Federated Malay States was founded. Rubber had brought amazing prosperity and disease prevention yielded increased dividends. The address provides much interesting information about Malaya, its peoples and

their diseases, and the efforts made by research workers and health departments to control disease prevalence during the last 28 years : this does not lend itself to summary. For the future, outstanding tasks include the application of recently acquired knowledge and techniques to the control of malaria ; an all-out attack on tuberculosis ; much more attention to nutrition and deficiency diseases, and an orientation of the work of the Health Services towards social medicine. *Norman White*

HARRISON, J. L. **A Key to the Squirrels of Malaya.** Reprinted from *Malayan Nature J.* 1948, Dec., v. 3, No. 4, 201–9, 4 figs. on 1 pl.

EDDEY, L. G. **An Example of Effective Disease Control in a Tropical Mining Community.** Reprinted from *Brit. Guiana Med. Ann., 1947.* 1948, 162–81, 6 figs.

This short report is written by Eddey, but he makes it clear that the work described was initiated and carried out by Dr. Michael Kenney, who " could not be persuaded to publish an account of these methods." Kenney was Resident Physician to the Kwakwani settlement of the Berbice Company, engaged in the mining of bauxite on the Berbice river in British Guiana. This settlement differed from many others in its cleanliness and good appointments, and the credit for this state of affairs goes to Kenney who, from 1943 onwards, had made it his business to introduce improvements on a large scale. He first instituted the routine of periodical examination of all the workers and their families (total about 400 persons), keeping adequate records and giving adequate treatment. The examinations included bi-monthly blood examinations, and monthly stool examinations, but as conditions improved these intervals were modified. In the early stages there was some difficulty over attendances, but this did not last long.

At first the workers were not well housed, but Kenney made good housing, with efficient mosquito screening, one of his main objectives, and he introduced bed-nets. In the early days of screening, some of the houses became traps in which large numbers of *Anopheles darlingi* or *A. aquasalis* could be found, with a very high rate of infection ; but improvements were made so thoroughly, and the people were made to understand the matter so well, that soon the houses were largely mosquito proof. [But it seems to the reviewer that this must have required much tireless supervision.] DDT was used, and the more permanent antilarval methods were executed ; the result was a great reduction in the number of anophelines captured.

Hookworm infestation and filariasis constituted serious problems, but they were dealt with as vigorously as malaria, the former by treatment and sanitary measures, the latter by anti-mosquito measures. Food and water supplies were regulated. Records show that from 1944 onwards the numbers of people given treatment in or out of hospital fell very considerably, as health conditions improved ; there was no slackening in the medical service given. One interesting feature of the work was the formation of an elected Employees' Health Committee whose function was to take a direct share in the welfare of the settlement.

[Altogether a notable achievement.] *Charles Wilcocks*

BOOK REVIEWS

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. SECTION ON MEDICAL SCIENCES. **Rickettsial Diseases of Man. A Symposium on the Rickettsial Diseases of Man, organized by the Section on Medical Sciences of the A.A.A.S., and presented at the Boston Meeting on December 26–28, 1946.** Organized by M. H. SOULE: Edited by F. R. MOULTON. 247 pp., 24 figs. & 3 maps. 1948. Washington 5: American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W. [$6.25; 37/6.]

This collection of 27 papers by 27 distinguished U.S.A. workers forms a very important contribution to knowledge of the rickettsial diseases of man. Special prominence is naturally given to the work of American investigators but the authors have by no means neglected the work of experts from other parts of the world, so that the book provides a concise, comprehensive, critical, and fully documented, review of the fresh knowledge of the subject that has been acquired during the years of World War II, and up to the end of 1946. The papers were read in 1946 so that the date of publication, 1948, is likely to give rise to misunderstandings.

Apart from trench fever, to which only a few casual references are made, all the known rickettsial diseases of man are dealt with from the points of view of epidemiology, aetiology, diagnosis, treatment, and prevention.

Bullis fever is referred to as not having been proved to be a rickettsial disease.

Although most of the subject matter has been published elsewhere its presentation in the form of collected papers will be greatly appreciated by all workers on the rickettsial diseases, especially as many references are made to reports which have not been published.

The first paper, by S. BAYNE-JONES, Director of the U.S.A. Typhus Commission, deals with Epidemic Typhus in the Mediterranean Area during the last War. Some sidelights are thrown on the dramatic story of the control of the 1943-44 epidemic in and round Naples, but a final review of the subject is said to be impossible owing to the occurrence of serious differences of opinion with regard to the contributions made by the various persons and organizations concerned in the operations. It appears, however, that the workers chiefly responsible for initiating the method of personal delousing, employed in more than three million "dustings" with DDT, were members of the Rockefeller Foundation Team, including J. A. FERRELL, F. L. SOPER, and C. M. WHEELER, the last-named of whom was actually serving with the Typhus Commission while on leave from the Foundation. Apparently the first trial of "hand blowers" was made in Mexico early in 1943, presumably by Rockefeller Foundation workers, and it seems only right that the worker or workers who first devised the simple but revolutionary method of dusting fully clothed persons should receive recognition.

The paper on Louse-Borne Typhus in Europe during the war is by J. E. GORDON. The epidemics in Japan and Korea are described by A. B. SCOVILLE, Jun. K. F. MAXCY gives a vivid account of Scrub Typhus among the U.S.A. troops. Between August, 1942 and December, 1943, there were 957 cases with 53 deaths in the American bases in the Pacific. Among the troops landed at Owi-Biak in Dutch New Guinea between June and August, 1944, there were 1,469 cases with only seven deaths, up to December of the same year.

In the India-Burma theatre between November, 1943, and July, 1945, there were 695 cases with 58 deaths among American troops.

The paper by J. H. DINGLE on Outbreaks of Q Fever during the War completes the description of the manner in which the rickettsial diseases affected the military forces of the U.S.A.

Clinical aspects of the fevers of the typhus group are dealt with in papers by A. YEOMANS (louse-borne typhus), T. E. WOODWARD (murine typhus), R. R. PARKER (Rocky Mountain spotted fever), and F. G. BLAKE (scrub typhus).

The excellent article on Treatment of the Rickettsial Diseases, by J. C. SNYDER, was written before the discovery of the remarkable efficacy of chloromycetin.

D. GREIFF, gives a critical summary of all the important work on the Biology of the rickettsiae. His view is that the organisms represent one of the earlier stages of the adaptation of pathogens to intracellular life, retaining their bacterium-like morphology and probably also some independent metabolic activity, while refusing to grow in cell-free media and failing to survive in dead cells.

H. PINKERTON discusses the Classification of Rickettsiae and Rickettsial Diseases. He recognizes five main groups of the diseases in man :—(1) Typhus (human and murine); (2) Spotted Fever (including boutonneuse fever, rickettsialpox ? and any other strains ?) ; (3) Tsutsugamushi disease; (4) Q Fever ; and (5) Trench Fever ? [The question marks are inserted by the author.] Trench fever is listed " only tentatively as a rickettsial disease." This sceptical attitude is not likely to be shared by many European workers.

The author refers to the reviewer's provisional classification of the typhus-like fevers according to the known transmitting vectors. This was originally proposed in 1921, not 1943 as stated by the author ; it is described as " admirably simple and implying certain important epidemiological truths ", and as being " the most difficult to disregard ", but he finds it open to many serious objections " notably the suggestion that the three diseases are fundamentally more closely related than they actually are." Curiously enough this objection is completely refuted in a later paper in the present series by G. B. WOLBACH, the father of modern research into the typhus fevers, who writes " Rocky Mountain spotted fever, typhus and tsutsugamushi disease constitute a unique disease group when considered in the light of many common features—arthropod transmission, rickettsial etiology, clinical characteristics, and pathology." Wolbach also refers to the diseases as " the tick-borne, the louse-borne, and the mite-borne rickettsial diseases."

The author's other objections to the classification are (1) " the difficulty of substituting these terms for others which are in established usage " : but the fevers are repeatedly called tick-borne, flea-borne, louse-borne, and mite-borne, and all of them have often been called typhus. (2) " That flea typhus, which is only a variety of louse typhus would be distinguished as sharply from the latter as the very different disease, ' tick typhus '." There is, however, a very real difference between flea-borne and louse-borne typhus ; the former is primarily a disease of lower animals, a " zootic " disease, and so is closely related to tick typhus and sharply different in this very important respect from louse typhus which is a human, " demic ", disease. (3) That " Q fever . . . could not reasonably be called tick typhus"; but why should it be so called ? ; it is not typhus-like and as Wolbach points out " it stands apart in its pathology". (4) That " the recently discovered rickettsialpox would make the term mite typhus ambiguous". Here again rickettsialpox is not typhus-like in its clinical features and so does not qualify for admission to the typhus group.

The author's use of the name spotted fever for the sub-group of tick-borne typhus fevers is open not only to the objection stated by himself, that the name has been given to meningococcus meningitis, but also because it is a literal translation of *Fleckfieber*, the German name of louse-borne typhus, and so is sure to cause the same confusion as has arisen in connexion with the German use of the name *Typhus* for typhoid fever.

In his discussion of the classification of the rickettsiae the author makes the following remark which will meet with general approval : " It therefore

does not appear that it would be profitable to attempt a definitive classification, even of the pathogenic rickettsiae at the present time", but he goes on to propose for temporary use a classification which involves a very debatable departure from existing usage; it closely follows the classification proposed by PHILIP [see this *Bulletin*, 1943, v. 40, 828] which includes the substitution of the names *Rickettsia prowazeki* var. *typhi* for *R. mooseri*; *Dermacentroxenus akari* for *R. akari*; and *Coxiella burneti* for *R. burneti*.

In the table the rickettsia of trench fever is shown as *Dermacentroxenus pediculi*; this is obviously due to a typographical error, but even if *Rickettsia pediculi* is intended the name seems much less suitable than the familiar *Rickettsia wolhynica* or *R. quintana*.

H. PINKERTON writes also on the isolation and identification of pathogenic rickettsiae. He regards the diagnosis of the rickettsial diseases by animal inoculation as the simplest and most satisfactory method, which is quite safe in skilled hands. His description of the method hardly bears out the claim for simplicity; there must be very few workers in the field who have the necessary facilities or technical skill that are required, and the author mentions that for the more certain identification of *R. prowazeki*, complement-fixation and rickettsia-agglutination tests may be needed, also that in certain strains of "spotted fever" cross immunity tests give ambiguous results so that the intranuclear clustering of the organisms may be the only criterion.

The best advice given is that in doubtful cases spleen or brain tissue from inoculated animals should be frozen, packed in dry ice in sealed containers and sent by air mail to one of the specialized laboratories for investigation.

S. B. WOLBACH contributes the article on The Pathology of the Rickettsial Diseases to which reference has already been made. He deals in detail with the tick-borne and louse-borne fevers of the typhus group on which he wrote classical monographs so long ago as 1919 and 1922. He also gives an excellent summary of what is known of the pathology of scrub typhus. In these diseases the capillaries are the first vessels to be affected, there is extension to the larger vessels, and important perivascular accumulation of monocyte cells. Little is known of the pathology of murine flea-borne typhus.

G. M. KOHLS discusses the Vectors of Rickettsial Diseases. He considers that the rickettsial causation of trench fever still remains doubtful and states that Bullis fever, though presumably tick-borne, has not been shown by clear-cut evidence to be caused by rickettsiae.

C. B. PHILIP writes on the Reservoirs of infection in Rickettsial Diseases. He is much inclined to agree with the views originally expressed by BLANC and CAMINOPETROS in 1932 that the tick is the real reservoir of boutonneuse fever and that many of the animals listed as reservoirs of this and other rickettsial infections transmitted by ticks, mites and fleas, are simply the hosts of the arthropods which are the true reservoirs.

R. J. HUEBNER summarizes what is known of rickettsialpox, the interesting new disease in whose investigation he played a leading part.

J. D. ZARAFONETIS describes The Serological Reactions in the Rickettsial Diseases of Man. He regards the complement-fixation test, with purified antigens, as the most satisfactory test, though the Weil-Felix test is very helpful in dealing with louse-borne typhus. In cases in which the fixation test is negative and the Weil-Felix test positive he advises the use of the rickettsia-agglutination test.

K. WERTMAN discusses the Weil-Felix Reaction which he regards as an important laboratory aid because of its simplicity and its advantage over the "specific" tests in giving somewhat earlier readings.

J. E. SMADEL deals with The Complement-Fixation and Agglutination Reactions and condenses into an article of eight pages a fully documented summary of the literature of the subject.

The late Harry PLOTZ contributed a brief, but instructive, article on The Soluble Substances of the Rickettsiae, a subject which he did so much to elucidate.

H. R. COX gives a detailed description of The Preparation and Standardization of Rickettsial Vaccines. Of special interest are the details of the methods by which one bacteriologist, one technician, one trained supervisor, and 17 non-technical laboratory workers, for nearly two years, handled 10,000 to 12,000 eggs daily and prepared enough vaccine each day to vaccinate 30,000 persons against epidemic typhus. The Cox-Craigie method was employed and was found suitable also for vaccines against murine typhus, Rocky Mountain spotted fever, and Q fever, but not for scrub typhus.

E. F. KNIPLING writes on DDT and other Insecticides ; he considers DDT to be the most satisfactory insecticide for dealing with louse and flea infestation.

D. M. GREELY summarizes The Methods of Application of DDT. G. H. BRADLEY and J. S. WILEY describe the methods employed in the Control of Murine Typhus in the U.S.A.

R. C. BUSHLAND contributes the last paper on Miticides and Mite Control. This paper, like all the others dealing with arthropod control, is written on eminently practical lines. *John W. D. Megaw*

SCHWETZ, J. **L'Evolution de la Médecine au Congo belge.** [The Development of Medical Services in the Belgian Congo.] Université Libre de Bruxelles. Institut de Sociologie Solvay, Actualités Sociales, n.s. 129 pp. 1946. Bruxelles : Office de Publicité, S.C., 36, rue Neuve. [55 fr.]

This small book is one of a series of *Actualités Sociales* published by the *Institut de Sociologie Solvay* of the *Université Libre de Bruxelles*, and it is written to explain and discuss the medical and social conditions of Africans and Europeans who live in the Congo.

It is probable that no one person has done more than Dr. Schwetz to build up the medical services of the Belgian Congo to their present high state of efficiency, and for this reason, as well as for its own intrinsic interest, a booklet by him on the progress of medicine in that vast country is to be welcomed.

Schwetz divides his book into four studies :—

1. From the early campaign against trypanosomiasis to the development of social medicine. The three sections here are historical—before the annexation of the country (1908), from annexation to 1918, and from 1918 onwards. Sleeping sickness, of course, was one of the main problems which thrust itself into prominence round the turn of the century, and it was little understood. There were a few hospitals and a few devoted doctors, who did what they could. But gradually equipment, buildings and staff became available, and medical activities extended. The two dominating diseases continued to be malaria and trypanosomiasis. Since 1918 there have been enormous advances in knowledge of tropical diseases, and many of these advances have originated in the Congo, but perhaps the most striking contribution of the Belgians has been their organization and the creation of FORÉAMI and the other branches of the medical services. The idea that the Africans should be studied thoroughly in their own surroundings by teams of experts living among them for long periods is a great step ahead of the older idea of setting up hospitals and waiting for patients to come for treatment.

2. The second study relates to the problem of malaria, its history, transmission in the Congo, the parasites and their development, and the general principles of treatment and prevention. The chapter is in effect an exposition of the facts of the disease and of its history, and a discussion of the present-day knowledge and of the problems still awaiting solution. It could be understood by a non-medical person.

3. In the third study Schwetz returns to trypanosomiasis in greater detail. He was a young doctor attached to the hospital service of the University of Lausanne when he first read of sleeping sickness, in 1902. In 1909 he went to the Congo. In this chapter he deals with the subject on lines similar to those of the chapter on malaria :—transmission, the parasites, control. In this chapter also the reader will gain the true impression of his immense first-hand knowledge of the subject, as well as of his great erudition. It is, as before, an exposition and a discussion written with clarity and interest.

4. In the fourth study Schwetz explains the development of the medical service of the Congo and the means devised to deal with the complex problems presented in so large and varied a country. *Charles Wilcocks*

AFRIKA : **Handbuch der praktischen Kolonialwissenschaften.** [Handbook of Practical Colonial Information.] Vol. XI, Part 2, pp. xii+675, 80 figs. 1943. Berlin : Walter de Gruyter & Co. **Krankheitsgeschehen und Gesundheitswesen** [MÜHLENS, P. & others]. [Incidence of Diseases and Medical Facilities.] pp. 1–508. **Die Akklimatisation der Europäer in Afrika** [GROBER, J.] [Acclimatization of Europeans in Africa.] pp. 509–638.

This volume, published during the war, is but one of a series produced under the patronage of General Ritter von Epp and under the editorship of Dr. Erich Obst, Professor in the University of Breslau. The purpose of this book, as set forth in the introduction, is to describe the geographical pathology of Africa. Many of the statistics, it is admitted, are compiled on rather insecure grounds as comparatively few comprehensive microscopical surveys of this great continent have actually been carried through. The book before us therefore represents a very ambitious project and has been undertaken with consideration of the vast array of literature concerned.

It would serve no useful purpose to follow the articles in detail as they are composed on rather familiar lines and comprise many statements which, owing to the lapse of time, have become out of date. Under malaria we find, for instance, statistical tables presenting the estimated number of malaria cases *per annum* and the number of fatalities for every country in the Dark Continent, and further details are given in an account of the status of malaria and blackwater fever in each particular country or colony. Trypanosomiasis, leishmaniasis, relapsing fever, yaws, ulcus tropicum, leptospirosis and rat-bite fever are handled in the same manner, and distributional maps are included. The difficulties already mentioned are multiplied in discussing intestinal infections, particularly the dysentery group. Even under the most civilized and organized conditions the exact differentiation of amoebic from bacillary dysentery is difficult enough, so that figures amassed in the field, in the absence of any statistical service, are gravely open to question. Although a strenuous effort has been made to put a brave front on this matter one is left wondering whether the imposing tables of the incidence of dysentery during the years 1929–1931 and comprising 2,686,778 cases, are worth the paper they are written upon. For instance in 1931, 1,968 cases of dysentery were notified from Egypt, while in the neighbouring Algeria there were only 39, and so on. Further on one reads that during the year 1929 in 75 faeces examinations no dysentery bacilli were ever found in Dar-es-Salaam. On the other hand in Zanzibar bacillary

dysentery constituted the predominant form. In 49 cultures 11 were positive (6 Shiga and 5 Flexner). In Mauritius and Réunion no attempt has been made to distinguish between the two main forms of dysentery.

These remarks by way of criticism may be said to apply to the other subjects such as typhoid, paratyphoid, plague, undulant fevers, the typhus group, yellow fever, dengue, phlebotomus fevers, worm infections, leprosy, the pock diseases, venereal diseases, avitaminoses, diphtheria, and zymotic fevers.

Medical institutions and facilities in every section of Africa are described in detail by C. SONNENSCHEIN and some are illustrated by photographs.

The contribution by J. GROBER on acclimatization of Europeans in Africa, which occupies some 124 pages, is free from statistical errors, being based upon generally accepted data, but it is entirely spoiled for the benefit of future generations by periodic explosions of Nazi ideological propaganda. "Herrenvolk" is a word with a nasty tang and it recurs with alarming frequency. A very fine distributional map of the African continent showing the range of the main tropical diseases is appended in the cover. *P. Manson-Bahr*

PESSÔA, Samuel Barnsley [Professor catedrático de Parasitologia da Faculdade de Medicina da Universidade São Paulo, etc.]. **Parasitologia Médica.** [Medical Parasitology.] 2nd Edition. Revised and enlarged. 997 pp., 409 text figs. & 41 coloured figs. on 2 pls. 1949. São Paulo: Editora Renascença S.A., Rua General Osoria, 384.

The appearance of a second edition of this manual after an interval of only three years since its first publication (1946) is a testimony of its success and indicates a continued demand among workers in Brazil for a textbook of parasitology in their own language. The present edition has been revised and enlarged. In addition to the subjects dealt with in the first edition [which has been fully reviewed in this *Bulletin*, 1947, v. 44, 939], four chapters on spirochaetes have been included in the section on protozoology. The chapter on malaria contains the latest data on the exoerythrocytic stages of the parasites and describes the advances in chemotherapy (paludrine, mepacrine, etc.) made during and after the last war. In the chapter on anopheline mosquitoes an account is given of the new insecticides and repellents. The number of illustrations has been increased, including a second coloured plate depicting the haemoflagellates. Here and there mis-spellings have been noted, *e.g.* Prowazeck for Prowazek, Fanthan for Fantham, *Leishmania braziliensis* for *L. brasiliensis*. However, these do not detract from the high standard of this treatise, which should be an indispensable guide to medical workers in South America.

C. A. Hoare

BINKHORST, C. D. **Toxoplasmosis. A Clinical Serological and Histopathological Study with special reference to the Eye Manifestations. Presentation of Twenty Cases of Proved or Presumable Toxoplasmic Retinopathy and Retinoencephalopathy with Associated Ocular Manifestations.** pp. x+163, 14 figs. (3 coloured) & 6 folding coloured pls. 1948. Leiden: H. E. Stenfert Kroese's Uitgevers-Maatschappij N.V. [19*s*.]

Though first reported from man in 1923, toxoplasmosis has been recognized as a human protozoal disease since the appearance of the work by WOLF and his co-workers in 1939. During the last decade numerous contributions to this subject have appeared, indicating that human toxoplasmosis is probably cosmopolitan in its distribution and that the incidence of the disease is considerably higher than the several dozen clinical cases hitherto recorded. The use of serological methods of diagnosis has brought to light the widespread

occurrence of symptomless infections, amounting, according to Sabin, to about 10 per cent. of the population.

However, our knowledge of this disease is still fragmentary, especially regarding its mode of transmission and epidemiology.

This book is divided into two almost equal parts. In the first part the author gives a detailed review of our present knowledge of toxoplasmosis. A description is given of the causative organism as it appears in man and other animals, together with a host-list. The available facts regarding the mode of transmission of toxoplasms are discussed, and a chapter is devoted to the various methods of diagnosis of toxoplasmosis—parasitological, serological and clinical. This is followed by a very complete account of all reported cases of toxoplasmosis in man, including those in which the diagnosis was confirmed parasitologically, those in which it was based on the neutralization test and those diagnosed clinically. A separate chapter is devoted to ocular lesions, ocular symptoms associated with positive serum tests, and cases suggestive of this disease. A short account of the effect of drugs in toxoplasmosis concludes the first part.

In the second part the author describes in great detail, illustrated by numerous figures and coloured plates, twenty cases of toxoplasmosis observed by him in persons varying in age from 10 days to 53 years, all of which were characterized by pathological changes in the retina and brain with associated ocular manifestations. In two cases the diagnosis was established by finding toxoplasms in the cerebrospinal fluid, while in the remaining cases there were ocular abnormalities resembling those in toxoplasmosis. In eleven of these toxoplasm-neutralizing antibodies were demonstrated in the serum, while in twelve cases they were present in the mothers of the patients. In seven patients there were ocular signs and cerebral symptoms suggestive of toxoplasmosis. The author regards the retinal lesions as the most significant symptoms in toxoplasmosis of the eye. These may be manifested by necrotic retinopathy, retinal granuloma and focal fundus changes. Among other ocular manifestations were noted optic atrophy, iritis, complicated cataract and microphthalmy. In view of the importance of clues presented by the retina, an ophthalmoscopic examination is considered to be indispensable for a clinical diagnosis of toxoplasmosis. The author also draws attention to the frequency of toxoplasmic symptoms in the families of patients, which seems to point to familial infection.

Both the up-to-date summary of our knowledge of toxoplasmosis and the original description of ocular manifestations in this disease form valuable contributions to the literature on the subject. *C. A. Hoare*

Printed under the authority of His Majesty's Stationery Office
by The South Essex Recorders, Ltd., Ilford.

(525) Wt. P20/360 7/49 S.E.R. Ltd. Gp. 432